GE Healthcare

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CE 0459

LOGIQ 100 PRO Basic User Manual

R1.x.x

Operating Documentation

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Regulatory Requirement

This product complies with regulatory requirements of the following European Directive 93/42/EEC concerning medical devices.

CE 0459

This manual is a reference for the LOGIQ 100 PRO. It applies to all versions of the R1.x.x software for the LOGIQ 100 PRO ultrasound system.

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Revision History

Reason for Change

REV	DATE	REASON FOR CHANGE
Rev.1	Jan 15, 2008	Initial Release for Logiq 100 PRO Tarang.
Rev.2	March 29, 2008	Updated Safety Information
Rev.3	May 05, 2008	Updated Safety Information
Rev.4	June 05, 2008	Updated Safety Information

List of Effective Pages

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Title Page	Rev.4	Chapter 9	Rev.4
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Please verify that you are using the latest revision of this document. Information pertaining to this document is maintained on ePDM (GE Healthcare electronic Product Data Management). If you need to know the latest revision, contact your distributor, local GE Sales Representative or in the USA call the GE Ultrasound Clinical Answer Center at 1 800 682 5327 or 1 262 524 5698.

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Regulatory Requirements

Conformance Standards

This product complies with the regulatory requirement of the following:

- Council Directive 93/42/EEC concerning medical devices: the CE label affixed to the product testifies compliance to the Directive.

  The location of the CE marking is shown in Safety chapter of this manual.

  Authorized EU Representative

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Conformance Standards (continued)

- International Organization of Standards (ISO)
  - ISO 10993-1 Biological evaluation of medical devices.
- Underwriters' Laboratories, Inc. (UL), an independent testing laboratory.
  - UL 60601-1 Medical Electrical Equipment, Part 1 General Requirements for Safety.

    ETL (Electronic Testing Laboratory) certificate by ITS,Based on UL 2601-1
- Medical Device Good Manufacturing Practice Manual issued by the FDA (Food and Drug Administration, Department of Health, USA).

Certifications

- General Electric Healthcare Ultrasound is ISO 9001 and ISO 13485 certified.

Original Documentation

- The original document was written in English.

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Chapter 1

Introduction

This chapter consists of information concerning indications for use/contra-indications, contact information, and how this documentation is organized.

System Overview

Attention

This manual contains necessary and sufficient information to operate the system safely. Advanced equipment training may be provided by a factory trained Application Specialist for the agreed-upon time period.

Read and understand all instructions in this manual before attempting to use the LOGIQ 100 PRO system.

Keep this User's Manual with the equipment at all times. Periodically review the procedures for operation and safety precautions.

Principles of Operation

Medical ultrasound images are created by computer and digital memory from the transmission and reception of mechanical high-frequency waves applied through a transducer. The mechanical ultrasound waves spread through the body, producing an echo where density changes occur. For example, in the case of human tissue, an echo is created where a signal passes from an adipose tissue (fat) region to a muscular tissue region. The echoes return to the transducer where they are converted back into electrical signals.

These echo signals are highly amplified and processed by several analog and digital circuits having filters with many frequency and time response options, transforming the high-frequency electrical signals into a series of digital image signals which are stored in memory. Once in memory, the image can be displayed in real-time on the image monitor. All signal transmission, reception and processing characteristics are controlled by the main computer. By selection from the system control panel, the user can alter the characteristics and features of the system, allowing a wide range of uses, from obstetrics to peripheral vascular examinations.

Transducers are accurate, solid-state devices, providing multiple image formats. The digital design and use of solid-state components provides highly stable and consistent imaging performance with minimal required maintenance. Sophisticated design with computer control offers a system with extensive features and functions which is user-friendly and easy to use.

Indications for Use

The LOGIQ 100 PRO is intended for use by a qualified physician for ultrasound evaluation. Specific clinical applications and exam types include:

- Radiology/Abdominal
- Obstetrics
- Gynecology
- Small Parts
- Urology
- Pediatric
- Neonatal Cephalic
- Musculo-skeletal Conventional and Superficial
- Transrectal
- Transvaginal

Contraindications

The LOGIQ 100 PRO ultrasound system is not intended for ophthalmic use or any use causing the acoustic beam to pass through the eye.

Prescription Device

CAUTION: United States law restricts this device to sale or use by, or on the order of a physician.

Contact Information

Contacting GE Healthcare Ultrasound

For additional information or assistance, please contact your local distributor or the appropriate support resource listed on the following pages:

INTERNET

http://www.gehealthcare.com

http://www.gehealthcare.com/usen/ultrasound/products/probe_care.html

USA

GE Healthcare TEL: (1) 800-437-1171
Ultrasound Service Engineering FAX: (1) 414-721-3865
9900 Innovation Drive
Wauwatosa, WI 53226

Clinical Questions

For information in the United States, Canada, Mexico and parts of the Caribbean, call the Customer Answer Center
TEL: (1) 800-682-5327 or (1) 262-524-5698

In other locations, contact your local Applications, Sales or Service Representative.

Service Questions

For service in the United States, call GE CARES

TEL: (1) 800-437-1171

For service for compact products in the United States, call

TEL: (1) 877-800-6776

In other locations, contact your local Service Representative.

Accessories Catalog Requests

To request the latest GE Accessories catalog or equipment brochures in the United States, call the Response Center

TEL: (1) 800-643-6439

In other locations, contact your local Applications, Sales or Service Representative.

Contacting GE Healthcare Ultrasound (continued)

Placing an Order

To place an order, order supplies or ask an accesory-related question in the United States, call the GE Access Center

TEL: (1) 800-472-3666

In other locations, contact your local Applications, Sales or Service Representative.

CANADA

GE Healthcare TEL: (1) 800-664-0732
Ultrasound Service Engineering
9900 Innovation Drive
Wauwatosa, WI 53226
Customer Answer Center TEL: (1) 262-524-5698

LATIN & SOUTH AMERICA

GE Healthcare TEL: (1) 262-524-5300
Ultrasound Service Engineering
9900 Innovation Drive
Wauwatosa, WI 53226
Customer Answer Center TEL: (1) 262-524-5698

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GE Ultraschall TEL: 0130 81 6370 toll free
Deutschland GmbH & Co. KG TEL: (33) 130.831.300
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Service Department - Ultrasound FAX: 65-272-3997
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Central Plaza
Singapore 169730

JAPAN

GE Yokogawa Medical Systems TEL: (81) 426-48-2950
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Buenos Aires - 1407

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Prinz Eugen Strasse 8/8 FAX: +43 1 505 38 74
A-1040 WIEN TLX: 136314

BELGIUM GE Medical Systems Benelux TEL: 0 800 11733 toll free
Gulkenrodestraat 3 FAX: +32 0 3 320 12 59
B-2160 WOMMELGEM TLX: 72722

BRAZIL GE Sistemas Medicos TEL: 0800-122345
Av Nove de Julho 5229 FAX: (011) 3067-8298
01407-907 Sao Paulo SP

DENMARK GE Medical Systems TEL: +45 4348 5400
Fabriksparken 20 FAX: +45 4348 5399
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FRANCE GE Medical Systems TEL: 05 49 33 71 toll free
738 rue Yves Carmen FAX: +33 1 46 10 01 20
F-92658 BOULOGNE CEDEX

GERMANY GE Ultraschall TEL: 0130 81 6370 toll free
Deutschland GmbH & Co. KG TEL: (49) 212.28.02.207
Beethovenstrasse 239 FAX: (49) 212.28.02.431
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G-171 21 NEA SMYRNI

ITALY GE Medical Systems Italia TEL: 1678 744 73 toll free
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LUXEMBOURG TEL: 0800 2603 toll free

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GE Sistemas Medicos de Mexico S.A. de C.V.
Rio Lerma #302, 1° y 2° Pisos TEL: (5) 228-9600
Colonia Cuauhtemoc FAX: (5) 211-4631
06500-Mexico, D.F.

NETHERLANDS
GE Medical Systems Nederland B.V. TEL: 06 022 3797 toll free
Atoomweg 512 FAX: +31 304 11702
NL-3542 AB UTRECHT

POLAND
GE Medical Systems Polska TEL: +48 2 625 59 62
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P-02-078 WARSZAWA

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GE Medical Systems Espana TEL: +34 (91) 663 25 00
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Poligono Industrial I TLX: 22384 A/B GEMDE
E-28850 TORREJON DE ARDOZ

SWEDEN
GE Medical Systems TEL: 020 795 433 toll free
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S-16428 KISTA TLX: 12228 CGRSWES

SWITZERLAND
GE Medical Systems (Schweiz) AG TEL: 155 5306 toll free
Sternmattweg 1 FAX: +41 41 421859
CH-6010 KRIENS

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Contacting GE Healthcare Ultrasound (continued)

UNITED KINGDOM

GE Medical Systems TEL: 0800 89 7905 toll free
Coolidge House FAX: +44 753 696067
352 Buckingham Avenue
SLOUGH
Berkshire SL1 4ER

OTHER COUNTRIES

NO TOLL FREE TEL: international code + 33 1 39 20 0007

Manufacturer

Wipro GE Healthcare PVT Limited
No.4, Kadugodi Indistrial Area,
Bangalore,
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INDIA, 560067
TEL: 91-80-41801000
FAX: 91-80-28452924

Chapter 2

Safety

Describes the safety and regulatory information pertinent for operating this ultrasound system.

Safety Precautions

Precaution Levels

Icon description

Various levels of safety precautions may be found on the equipment and different levels of concern are identified by one of the following flag words and icons which precede the precautionary statement.

DANGER

Indicates that a specific hazard is known to exist which through inappropriate conditions or actions will cause:

- Severe or fatal personal injury
- Substantial property damage.

WARNING

Indicates that a specific hazard is known to exist which through inappropriate conditions or actions may cause:

- Severe personal injury
- Substantial property damage.

CAUTION

Indicates that a potential hazard may exist which through inappropriate conditions or actions will or can cause:

- Minor injury
- Property damage.

NOTE: *Indicates precautions or recommendations that should be used in the operation of the ultrasound system, specifically:*

- *Maintaining an optimum system environment*
- *Using this Manual*
- *Notes to emphasize or clarify a point.*

Hazard Symbols

Icon Description

Potential hazards are indicated by the following icons:

Table 2-1: Potential Hazards

Icon	Potential Hazard	Usage	Source
	• Patient/user infection due to contaminated equipment.	• Cleaning and care instructions • Sheath and glove guidelines	ISO 7000 No. 0659
	• Electrical micro-shock to patient, e.g., ventricular	• Probes • ECG, if applicable • Connections to back panel	
	• Console, accessories or optional storage devices that can fall on patient, user, or others. • Collision with persons or objects may result in injury while maneuvering or during system transport. • Injury to user from moving the console.	• Moving • Using brakes • Transporting	
	• Patient injury or tissue damage from ultrasound radiation.	• ALARA, the use of Power Output following the ‘as low as reasonably achievable’ principle	
	• Risk of explosion if used in the presence of flammable anesthetics.	• Flammable anesthetic	
	• Patient/user injury or adverse reaction from fire or smoke. • Patient/user injury from explosion and fire.	• Replacing fuses • Outlet guidelines	

Important Safety Considerations

The following topic headings (Patient Safety, and Equipment and Personnel Safety) are intended to make the equipment user aware of particular hazards associated with the use of this equipment and the extent to which injury can occur if precautions are not observed. Additional precautions may be provided throughout the manual.

Improper use can result in serious injury. The user must be thoroughly familiar with the instructions and potential hazards involving ultrasound examination before attempting to use the device. Training assistance is available from GE Healthcare if needed.

The equipment user is obligated to be familiar with these concerns and avoid conditions that could result in injury.

Patient Safety

Related Hazards

The concerns listed can seriously affect the safety of patients undergoing a diagnostic ultrasound examination.

Patient identification

Always include proper identification with all patient data and verify the accuracy of the patient's name and ID numbers when entering such data. Make sure correct patient ID is provided on all recorded data and hard copy prints. Identification errors could result in an incorrect diagnosis.

Diagnostic information

Equipment malfunction or incorrect settings can result in measurement errors or failure to detect details within the image. The equipment user must become thoroughly familiar with the equipment operation in order to optimize its performance and recognize possible malfunctions. Applications training is available through the local GE representative. Added confidence in the equipment operation can be gained by establishing a quality assurance program.

Allowing the machine to transmit acoustic output with the probe not in use (or in its holder) can cause the transducer to build up heat. Freeze the image when the machine is not in use.

Related Hazards (continued)

Mechanical hazards

The use of damaged probes or improper use and manipulation of intracavity probes can result in injury or increased risk of infection. Inspect probes often for sharp, pointed, or rough surface damage that could cause injury or tear protective barriers. Never use excessive force when manipulating intracavity probes. Become familiar with all instructions and precautions provided with special purpose probes.

The use of damaged probes can result in injury or increased risk of infection. Inspect probes often for sharp, pointed, or rough surface damage that could cause injury or tear protective barriers. Become familiar with all instructions and precautions provided with special purpose probes.

Electrical Hazard

A damaged probe can also increase the risk of electric shock if conductive solutions come in contact with internal live parts. Inspect probes often for cracks or openings in the housing and holes in and around the acoustic lens or other damage that could allow liquid entry. Become familiar with the probe's use and care precautions outlined in *Probes and Biopsy*.

CAUTION

Ultrasound transducers are sensitive instruments which can easily be damaged by rough handling. Take extra care not to drop transducers and avoid contact with sharp or abrasive surfaces. A damaged housing, lens or cable can result in patient injury or serious impairment or operation.

Related Hazards (continued)

Ultrasound can produce harmful effects in tissue and potentially result in patient injury. Always minimize exposure time and keep ultrasound levels low when there is no medical benefit. Use the principle of ALARA (As Low As Reasonably Achievable), increasing output only when needed to obtain diagnostic image quality. Observe the acoustic output display and be familiar with all controls affecting the output level. See the *Bioeffects section* of the *Acoustic Output chapter* in the *Advanced Reference Manual* for more information.

Do not use with Defibrillator.

This equipment does not have a defibrillator approved applied part.

Training

It is recommended that all users receive proper training in applications before performing them in a clinical setting. Please contact the local GE representative for training assistance.

ALARA training is provided by GE Application Specialists. The ALARA education program for the clinical end-user covers basic ultrasound principles, possible biological effects, the derivation and meaning of the indices, ALARA principles, and examples of specific applications of the ALARA principle.

Equipment and Personnel Safety

Related Hazards

This equipment contains dangerous voltages that are capable of serious injury or death.

If any defects are observed or malfunctions occur, stop operating the equipment and perform the proper action for the patient. Inform a qualified service person and contact a Service Representative for information.

There are no user serviceable components inside the console. Refer all servicing to qualified service personnel only.

Only approved and recommended peripherals and accessories should be used.

All peripherals and accessories must be securely mounted to the LOGIQ 100 PRO.

The LOGIQ 100 PRO is not intended to be used as a storage device; backup of the Patient and Image Database is your institution's responsibility. GE is NOT responsible for any lost patient information or for lost images.

The concerns listed below can seriously affect the safety of equipment and personnel during a diagnostic ultrasound examination.

Risk of explosion if used in the presence of flammable anesthetics.

Related Hazards (continued)

CAUTION

This equipment provides no special means of protection from high frequency (HF) burns that may result from using an electrosurgical unit (ESU). To reduce the risk of HF burns, avoid contact between the patient and ultrasound transducer while operating the ESU. Where contact cannot be avoided, as in the case of TEE monitoring during surgery, make sure the transducer is not located between the ESU active and dispersive electrodes and keep the ESU cables away from the transducer cable.

Electrical Hazard

To avoid injury:

- Do not remove protective covers. No user serviceable parts are inside. Refer servicing to qualified service personnel.
- To assure adequate grounding, connect the attachment plug to a reliable (hospital grade) grounding outlet (having equalization conductor ⏚).
- Never use any adaptor or converter of a three-prong-to-two-prong type to connect with a mains power plug. The protective earth connection will loosen.
- Do not place liquids on or above the console. Spilled liquid may contact live parts and increase the risk of shock.
- Plug any peripherals into the LOGIQ 100 PRO AC power outlet.

CAUTION

Do not use this equipment if a safety problem is known to exist. Have the unit repaired and performance verified by qualified service personnel before returning to use.

Smoke & Fire Hazard

The system must be supplied from an adequately rated electrical circuit. The capacity of the supply circuit must be as specified.

Related Hazards (continued)

Biological Hazard

For patient and personnel safety, be aware of biological hazards while performing invasive procedures. To avoid the risk of disease transmission:

- Use protective barriers (gloves and probe sheaths) whenever possible. Follow sterile procedures when appropriate.
- Thoroughly clean probes and reusable accessories after each patient examination and disinfect or sterilize as needed. Refer to *Probes and Biopsy* for probe use and care instructions.
- Follow all infection control policies established by your office, department or institution as they apply to personnel and equipment.

CAUTION

Contact with natural rubber latex may cause a severe anaphylactic reaction in persons sensitive to the natural latex protein. Sensitive users and patients must avoid contact with these items. Refer to package labeling to determine latex content and FDA's March 29, 1991 Medical Alert on latex products.

CAUTION

Allowing the machine to transmit acoustic output with the probe not in use (or in its holder) can cause the transducer to build up heat. Always turn off acoustic output or freeze the image when not in use. The system's acoustic output remains transmitting when the user controls are being used.

Related Hazards (continued)

Archived data is managed at the individual sites. Performing data backup (to any device) is recommended.

Do not unpack the LOGIQ 100 PRO. This must be performed by qualified service personnel only.

Device Labels

Label Icon Description

The following table describes the purpose and location of safety labels and other important information provided on the equipment.

Table 2-2: Label Icons

Label/Icon	Purpose/Meaning	Location
Identification and Rating Plate	• Manufacturer's name and country of origin • Date of manufacture • Model and serial numbers • Electrical ratings (Volts, Amps, phase, and frequency)	See Figure 2-2 for location information.
Type/Class Label	Used to indicate the degree of safety or protection.	
IP Code (IPX8)	Indicates the degree of protection provided by the enclosure per IEC60 529. Can be used in operating room environment.	Foot switch
	Type BF Applied Part (man in the box) symbol is in accordance with IEC 60878-02-03.	Probe marked Type BF
	"ATTENTION" - Consult accompanying documents" is intended to alert the user to refer to the operator manual or other instructions when complete information cannot be provided on the label.	Various
	"CAUTION" - Dangerous voltage" (the lightning flash with arrowhead) is used to indicate electric shock hazards.	Inside of console
	"Mains OFF" indicates the power off position of the mains power breaker.	See Figure 2-2 for location information.
	"Mains ON" indicates the power on position of the mains power breaker.	See Figure 2-2 for location information.
	"Protective Earth" indicates the protective earth (grounding) terminal.	Internal

Table 2-2: Label Icons

Label/Icon	Purpose/Meaning	Location
	“Equipotentiality” indicates the terminal to be used for connecting equipotential conductors when interconnecting (grounding) with other equipment. Connection of additional protective earth conductors or potential equalization conductors is not necessary in most cases and is only recommended for situations involving multiple equipment in a high-risk patient environment to provide assurance that all equipment is at the same potential and operates within acceptable leakage current limits. An example of a high-risk patient would be a special procedure where the patient has an accessible conductive path to the heart such as exposed cardiac pacing leads.	Rear of console
	Alternating Current symbol is in accordance with IEC 60878-01-14.	Rear Panel, Circuit breaker label of console and front panel (if applicable).
	This symbol indicates that waste electrical and electronic equipment must not be disposed of as unsorted municipal waste and must be collected separately. Please contact an authorized representative of the manufacturer for information concerning the decommissioning of your equipment.	Rear Panel
	No hazardous substance, above the maximum concentration value, is present. Maximum concentration values for electronic information products, as set by the People’s Republic of China Electronic Industry Standard SJ/T11364-2006, include the hazardous substances of lead, mercury, hexavalent chromium, cadmium, polybrominated biphenyl (PBB), and polybrominated diphenyl ether (PBDE).	

Table 2-2: Label Icons

Label/Icon	Purpose/Meaning	Location
	Indicates the presence of hazardous substance(s) above the maximum concentration value. Maximum concentration values for electronic information products, as set by the People's Republic of China Electronic Industry Standard SJ/T11364-2006, include the hazardous substances of lead, mercury, hexavalent chromium, cadmium, polybrominated biphenyl (PBB), and polybrominated diphenyl ether (PBDE). "10" indicates the number of years during which the hazardous substance(s) will not leak or mutate so that the use of this product will not result in any severe environmental pollution, bodily injury, or damage to any assets.	Rear Panel, China Rating Plate
	Do not use the following devices near this equipment: cellular phone, radio receiver, mobile radio transmitter, radio controlled toy, broadband power lines, etc. Use of these devices near this equipment could cause this equipment to perform outside the published specifications. Keep power to these devices turned off when near this equipment.	Rear Panel

Label Icon Description (continued)

Classifications

Type of protection against electric shock

Class I Equipment (*1)

Degree of protection against electric shock

Type BF Applied part (*2) (for Probes marked with BF symbol)

System is Ordinary Equipment (IPX0)

Footswitch is IPX8

1. Class I Equipment

EQUIPMENT in which protection against electric shock does not rely on BASIC INSULATION only, but includes an earth ground. This additional safety precaution prevents exposed metal parts from becoming LIVE in the event of an insulation failure.

2. Type BF Applied Part

TYPE BF APPLIED PART providing a specified degree of protection against electric shock, with particular regard to allowable LEAKAGE CURRENT.

Table 2-3: Type BF Equipment

	Normal Mode	Single fault condition
Patient leakage current	Less than 100 microA	Less than 500 microA

EMC (Electromagnetic Compatibility)

NOTE: This equipment generates, uses and can radiate radio frequency energy. The equipment may cause radio frequency interference to other medical and non-medical devices and radio communications. To provide reasonable protection against such interference, this product complies with emissions limits for a Group 1, Class A Medical Devices Directive as stated in EN 60601-1-2. However, there is no guarantee that interference will not occur in a particular installation.

NOTE: If this equipment is found to cause interference (which may be determined by turning the equipment on and off), the user (or qualified service personnel) should attempt to correct the problem by one or more of the following measure(s):

- *Reorient or relocate the affected device(s)*
- *Increase the separation between the equipment and the affected device*
- *Power the equipment from a source different from that of the affected device*
- *Consult the point of purchase or service representative for further suggestions.*

NOTE: The manufacturer is not responsible for any interference caused by using other than recommended interconnect cables or by unauthorized changes or modifications to this equipment. Unauthorized changes or modifications could void the users' authority to operate the equipment.

NOTE: To comply with the regulations on electromagnetic interference for a Class A FCC Device, all interconnect cables to peripheral devices must be shielded and properly grounded. Use of cables not properly shielded and grounded may result in the equipment causing radio frequency interference in violation of the FCC regulations.

EMC (Electromagnetic Compatibility) (continued)

EMC Performance

All types of electronic equipment may characteristically cause electromagnetic interference with other equipment, either transmitted through air or connecting cables. The term EMC (Electromagnetic Compatibility) indicates the capability of equipment to curb electromagnetic influence from other equipment and at the same time not affect other equipment with similar electromagnetic radiation from itself.

Proper installation following the service manual is required in order to achieve the full EMC performance of the product.

The product must be installed as stipulated in Notice upon Installation of Product.

In case of issues related to EMC, please call your service personnel.

The manufacturer is not responsible for any interference caused by using other than recommended interconnect cables or by unauthorized changes or modifications to this equipment. Unauthorized changes or modifications could void the users' authority to operate the equipment.

EMC Performance (continued)

CAUTION

Do not use devices which intentionally transmit RF signals (cellular phones, transceivers, or radio controlled products), other than those supplied by GE (wireless microphone, broadband over power lines, for example) unless intended for use with this system, in the vicinity of this equipment as it may cause performance outside the published specifications.

Keep power to these devices turned off when near this equipment.

Medical staff in charge of this equipment is required to instruct technicians, patients and other people who may be around this equipment to fully comply with the above regulation.

Portable and mobile radio communications equipment (e.g. two-way radio, cellular/cordless telephones and similar equipment) should be used no closer to any part of this system, including cables, than determined according to the following method:

Table 2-4: Portable and mobile radio communications equipment distance requirements

Frequency Range:	**150 kHz - 80 MHz**	**80 MHz - 800 MHz**	**800 MHz - 2.5 GHz**
Calculation Method:	d=[3.5/V_1] square root of P	d = [3.5/E_1] square root of P	d = [7/E_1] square root of P
Where: d= separation distance in meters, P = rated power of the transmitter, V_1=compliance value for conducted RF, E_1 = compliance value for radiated RF			
If the maximum transmitter power in watts is rated	**The separation distance in meters should be**		
5	2.6	2.6	5.2
20	5.2	5.2	10.5
100	12.0	12.0	24.0

Notice upon Installation of Product

Separation distance and effect from fixed radio communications equipment: field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast, and TV broadcast transmitter cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which the ultrasound system is used exceeds the applicable RF compliance level as stated in the immunity declaration, the ultrasound system should be observed to verify normal operation. If abnormal operation is observed, additional measures may be necessary, such as re-orienting or relocating the ultrasound system or using an RF shielded examination room may be necessary.

1. Use either power supply cords provided by GE Healthcare or ones designated by GE Healthcare. Products equipped with a power source plug should be plugged into the fixed power socket which has the protective grounding conductor. Never use any adaptor or converter to connect with a power source plug (e.g. three-prong-to-two-prong converter).
2. Locate the equipment as far away as possible from other electronic equipment.
3. Be sure to use only the cables provided by or designated by GE Healthcare. Connect these cables following the installation procedures (e.g. wire power cables separately from signal cables).
4. Lay out the main equipment and other peripherals following the installation procedures described in the Option Installation manuals.

General Notice

1. Designation of Peripheral Equipment Connectable to This Product.

   The equipment indicated in Chapter 15 can be hooked up to the product without compromising its EMC performance.

   Avoid using equipment not designated in the list. Failure to comply with this instruction may result in poor EMC performance of the product.

2. Notice against User Modification

   The user should never modify this product. User modifications may cause degradation in EMC performance.

   Modification of the product includes changes in:

   a. Cables (length, material, wiring, etc.)
   b. System installation/layout
   c. System configuration/components
   d. Securing system parts (cover open/close, cover screwing)

3. Operate the system with all covers closed. If a cover is opened for some reason, be sure to shut it before starting/ resuming operation.
4. Operating the system with any cover open may affect EMC performance.

Peripheral Update for EC countries

The following is intended to provide the users in EC countries with updated information concerning the connection of the LOGIQ 100 PRO to image recording and other devices or communication networks.

Peripheral used in the patient environment

The LOGIQ 100 PRO has been verified for overall safety, compatibility and compliance with the following on-board image recording devices:

- Sony UP897 MDW/UPD897 B&W Video Graphic Printer (Option)
- USB Memory Stick (Option)
- USB Footswitch (Option)
- HP Laserjet Printer (Option)
- TWO Probe Port (Option)
- L200 Probe Adapter (Option)

Peripheral used in the non-patient environment

Connection may also be made to a CE Marked and IEC/EN 60950 compliant modem using one of the serial or USB ports on the system.

The LOGIQ 100 PRO may also be used safely while connected to devices other than those recommended above if the devices and their specifications, installation, and interconnection with the system conform to the requirements of IEC/EN 60601-1-1.

Peripheral Update for EC countries (continued)

General precautions for installing an alternate on-board device would include:

1. The added device must have appropriate safety standard conformance and CE Marking.
2. The total power consumption of the added devices, which connect to the LOGIQ 100 PRO and are used simultaneously, must be less than or equal to the rated supply of the LOGIQ 100 PRO.
3. There must be adequate heat dissipation and ventilation to prevent overheating of the device.
4. There must be adequate mechanical mounting of the device and stability of the combination.
5. Risk and leakage current of the combination must comply with IEC/EN 60601-1.
6. Electromagnetic emissions and immunity of the combination must conform to IEC/EN 60601-1-2.

General precautions for installing an alternate off-board, remote device or a network would include:

1. The added device(s) must have appropriate safety standard conformance and CE Marking.
2. The added device(s) must be used for their intended purpose having a compatible interface.
3. Signal or mains isolation devices and additional protective earth may be needed to assure compliance with IEC/EN 60601-1-1.

The connection of equipment or transmission networks other than as specified in the user instructions can result in an electric shock hazard or equipment malfunction. Substitute or alternate equipment and connections requires verification of compatibility and conformity to IEC/EN 60601-1-1 by the installer. Equipment modifications and possible resulting malfunctions and electromagnetic interference are the responsibility of the owner.

Declaration of Emissions

This system is suitable for use in the following environment. The user must assure that it is used only in the electromagnetic environment as specified.

Table 2-5: Declaration of Emissions

Emission Type	Compliance	Electromagnetic Environment
CISPR 11 RF Emissions	Group 1 Class A	This system uses RF energy only for its internal function. Therefore, RF emissions are very low and are not likely to cause any interference in nearby electronic equipment. It is suitable for use in all establishments, other than domestic establishments and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes.

Declaration of Immunity

This system is suitable for use in the following environment. The user must assure that the system is used according to the specified guidance and only in the electromagnetic environment listed.

Table 2-6: Declaration of Immunity

Immunity Type	Equipment Capability	Regulatory Acceptable Level	EMC Environment and Guidance
IEC 61000-4-2 Static discharge (ESD)	± 6 kV contact ± 8 kV air	± 6 kV contact ± 8 kV air	Floors should be wood, concrete, or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30%. Mains power quality should be that of a typical commercial and/or hospital environment. If the user requires continued operation during power mains interruptions, it is recommended that the system be powered from a UPS or a battery. NOTE: UT is the a.c. mains voltage prior to application of the test level. Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial and/or hospital environment. Separation distance to radio communication equipment must be maintained according to the method below. Interference may occur in the vicinity of equipment marked with the symbol: Image degradation or interference may occur due to conducted RF noise on the equipment mains power supply or other signal cable. Such interference is easily recognized and distinguishable from patient anatomy and physiological waveforms. Interference of this type may delay the examination without affecting diagnostic accuracy. Additional mains/ signal RF isolation or filtering may be needed if this type interference occurs frequently.
IEC 61000-4-4 Electrical fast transient/burst	± 2 kV for mains ± 1 kV for SIP/ SOP	± 2 kV for mains ± 1 kV for SIP/SOP	
IEC 61000-4-5 Surge Immunity	± 1 kV differential ± 2 kV common	± 1 kV differential ± 2 kV common	
IEC 61000-4-11 Voltage dips, short interruptions and voltage variations on mains supply	< 50_T (> 95% dip) for 0.5 cycle; 400_T (60 0ip) for 5 cycles; 700_T (30 0ip) for 25 cycles; < 50_T (>95% dip) for 5 sec	< 50_T (> 95% dip) for 0.5 cycle; 400_T (60 0ip) for 5 cycles; 700_T (30 0ip) for 25 cycles; < 50_T (>95% dip) for 5 sec	
IEC 61000-4-8 Power frequency (50/60 Hz) magnetic field	3 A/m	3 A/m	
IEC 61000-4-6 Conducted RF	3 V_{RMS} 150 kHz - 80 MHz	3 V_{RMS} 150 kHz - 80 MHz	
IEC 61000-4-3 Radiated RF	3 V/m 80 MHz - 2.5 GHz	3 V/m 80 MHz - 2.5 GHz	
NOTE: These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects, and people. If noise generated from other electronic equipment is near the probe's center frequency, noise may appear on the image. Good power line isolation is required.			

Patient Environmental Devices

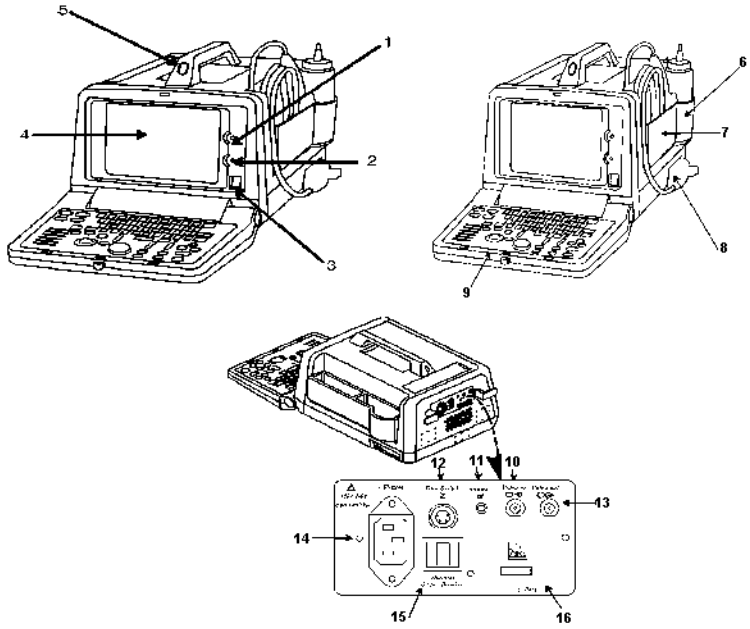


Figure 2-1. Patient Environmental Devices

Patient Environmental Devices (continued)

1. Brightness Control: This control adjusts the brightness of the display to the operator interface
2. Contrast Control: This control adjusts the contrast of the display to the operator interface
3. Power On/Off(I/O): Use to turn On/Off the Main AC power to the system.
4. Monitor: It displays the image and scan parameter data.
5. Handle: Use to aid in the movement of the system.
6. Gel Holder: Use to hold gel bottle when the L100 system is being moved.
7. Probe Holder: The probe can be stored in the probe holder, when not in use.
8. Probe Connector: connects the probe to the system
9. Keyboard: Used for patient data entry, and to change scan parameter for image annotation, VCR controld and selection of various function menus.
10. Video in: Enables an External signal (VCR play back)
11. Shutter: Connects the Video graphic printer for remote operation.
12. Foot Switch: An optional foot Switch is provided as an accessory to be used in parallel with or as an alternative to the Freeze key.Enables the foot switch to freeze a real time image.
13. Video Out: Enables the connection of a video signal to external equipment Video graphic printer,VCR recording
14. Power Socket:Connects the main AC input
15. Circuit Breaker: The circuit breaker automatically shuts off power to the system in case power over load.
16. USB Port: Used for printer and image transfer to USB Flash Drive.

Acceptable Devices

The Patient Environmental devices shown on the previous page are specified to be suitable for use within the PATIENT ENVIRONMENT.

CAUTION

DO NOT connect any probes or accessories without approval by GE within the PATIENT ENVIRONMENT.

See ‘Peripheral Update for EC countries’ on *page 2-21 for more information.*

Unapproved Devices

CAUTION

DO NOT use unapproved devices.

If devices are connected without the approval of GE, the warranty will be INVALID.

Any device connected to the LOGIQ 100 PRO must conform to one or more of the requirements listed below:

1. IEC standard or equivalent standards appropriate to devices.
2. The devices shall be connected to PROTECTIVE EARTH (GROUND).

Accessories, Options, Supplies

CAUTION

Unsafe operation or malfunction may result. Use only the accessories, options and supplies approved or recommended in these instructions for use.

Warning Label Location

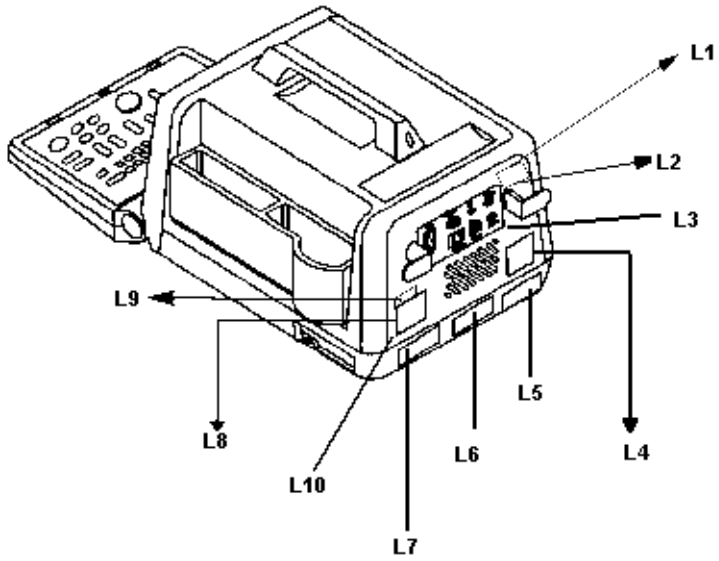


Figure 2-2. Label Location

Warning Label Location (continued)

Figure 2-3. RoHS Label

Figure 2-4. WEEE Caution Label

Figure 2-5. ESD Label

Warning Label Location (continued)

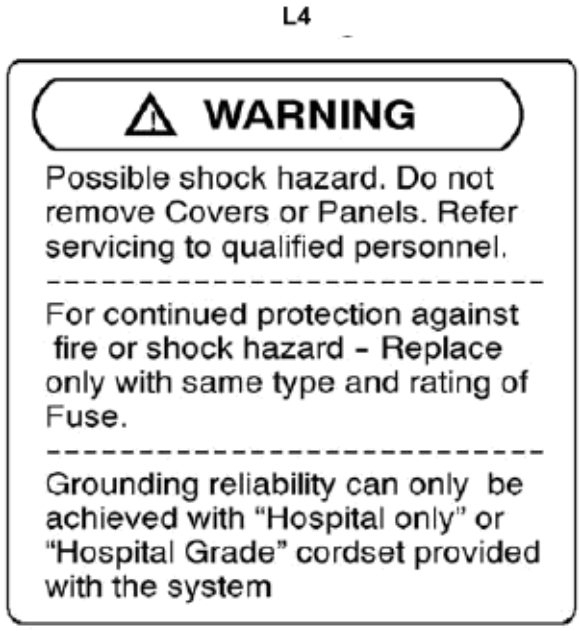

L4
WARNING
Possible shock hazard. Do not remove Covers or Panels. Refer servicing to qualified personnel.
For continued protection against fire or shock hazard - Replace only with same type and rating of Fuse.
Grounding reliability can only be achieved with "Hospital only" or "Hospital Grade" cordset provided with the system

Figure 2-6. Warning Label

Warning Label Location (continued)

L5

CAUTION
Do not use the fo lowing devices
near this equipment.
Cellu ar phone, rad o transceiver,
mobi e radio transmitter,
rad o-controller toy etc
Use of these devices could cause
this equipment to perform outside
the published specificat ons.
Keep power to these devices
turned off when near this
equipment.

Figure 2-7. Caution Label

L6

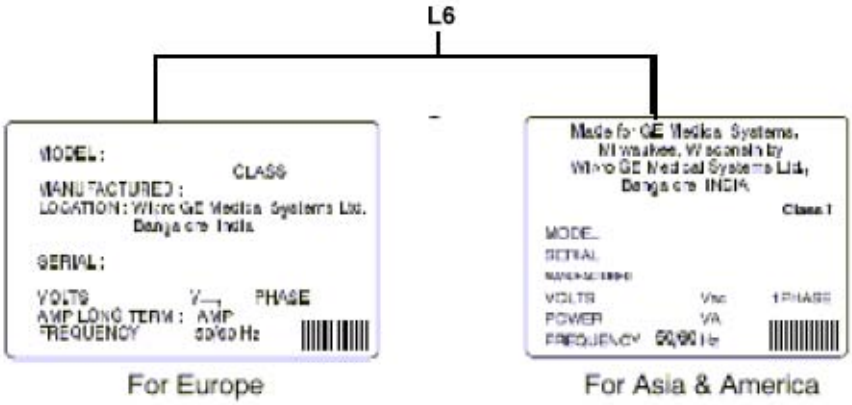


Figure 2-8. Rating Plate Label

Warning Label Location (continued)

L7

Figure 2-9. TUV Label

L8

DANGER
Possible explosion hazard if used in the presence of flammable anesthetics.
CAUTION
Do not use with Defibrillator.
United State law restricts this device to sale or use by or on the order of a physician

Figure 2-10. Danger/Caution Label

Warning Label Location (continued)

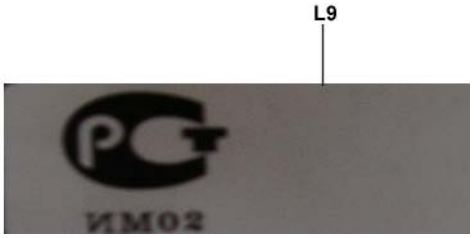


Figure 2-11. Gost Label

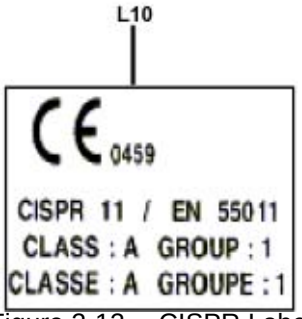


Figure 2-12. CISPR Label

Warning Label Location (continued)

L1(Figure 2-3)
Rohs Label (China Only).
L2(Figure 2-4)
WEEE Label: This symbol indicates that the waste of electrical and electronic equipment must not be disposed as unsorted municipal waste and must be collected separately. Please contact an authorized representative of the manufacturer for information concerning the decommissioning of your equipment.
L3(Figure 2-5)
ESD Label.
L4(Figure 2-6)
Warning Label: Possible shock hazard. Do not remove covers or panels. No user serviceable parts are inside. Refer servicing to qualified service personnel.
L5(Figure 2-7)
Do not use the following devices near this equipment: cellular phone, radio receiver, mobile radio transmitter, radio controlled toy, etc. Use of these devices near this equipment could cause this equipment to perform outside the publishedspecifications. Keep power to these devices turned off when near this equipment.
L6(Figure 2-8)
Rating Plate Label.
L7(Figure 2-9)
TUV Label: TUV Listing and Certification Mark is used to designate conformance to nationally recognized product safety standards. The Mark bears the name and/or logo of the testing laboratory, product category, safety standard to which conformity is assessed, and a control number
L8(Figure 2-10)
Danger/Caution Label: Prescription Device: United States law restricts this device to sale or use by or on the order of a physicians U.S.A. Only
L9(Figure 2-11)
Gost Label (Russia Only).
L10(Figure 2-12)
The CE Mark of Conformity indicates this equipment conforms with the Council Directive 93/42/EEC
CISPR CAUTION: The LOGIQ 100 PRO conforms to the CISPR11, Group 1, Class A of the international standard for Electromagnetic disturbance characteristics.

Chapter 3

Preparing the System for Use

Describes the site requirements, console overview, system positioning/transporting, powering on the system, adjusting the display monitor, probes and operator controls.

Preparing The System For Use

Introduction

NOTE: *Only qualified physicians or sonographers should perform ultrasound scanning on human subjects for medical diagnostic reasons. Request training, if needed.*

Do not attempt to install the system alone. General Electric, Affiliate, or Distributor Field Engineers and Application Specialists will install and setup the system. See ‘Contact Information’ on *page 1-5 for more information.*

The LOGIQ 100 PRO does not contain any operator serviceable internal components. Ensure that unauthorized personnel do not tamper with the unit.

Perform regular preventive maintenance. See ‘System Care and Maintenance’ on *page 15-10 for more information.*

Maintain a clean environment. Turn off, and if possible, disconnect the system before cleaning the unit. See ‘System Care and Maintenance’ on *page 15-10 for more information.*

Never set liquids on the unit to ensure that liquid does not drip into the control panel or unit.

Before the system arrives

NOTICE

This medical equipment is approved, in terms of the prevention of radio wave interference, to be used in hospitals, clinics and other institutions which are environmentally qualified. The use of this equipment in an inappropriate environment may cause some electronic interference to radios and televisions around the equipment.

Ensure that the following is provided for the new system:

- A separate power outlet with a 3 amp circuit breaker for 120 VAC (USA) or 2 amp circuit breaker for 220-240 VAC (Europe, Latin America, and Asia).
- Take precautions to ensure that the console is protected from electromagnetic interference.

  Precautions include:

  - Operate the console at least 15 feet away from motors, typewriters, elevators, and other sources of strong electromagnetic radiation.
  - Operation in an enclosed area (wood, plaster or concrete walls, floors and ceilings) helps prevent electromagnetic interference.
  - Special shielding may be required if the console is to be operated in the vicinity of radio broadcast equipment.

In order to properly install the system, certain hardware must be in place and operational within the room where the console is used.

Environmental Requirements

The system should be operated, stored, or transported within the parameters outlined below. Either its operational environment must be constantly maintained or the unit must be turned off.

NOTE: You may get an overheating message with regard to fan speed. Ensure adequate system/room ventilation.

Table 3-1: System Environmental Requirements

	Operational	**Storage**	**Transport (<16hrs.)**
Temperature	10 - 40 degrees C 50 - 104 degrees F	10 - 60 degrees C 14 - 140 degrees F	-40 - 60 degrees C -40 - 140 degrees F
Humidity	30 - 75% non-condensing	30 - 90% non-condensing	30 - 90% non-condensing
Pressure	700 - 1060hPa	700 - 1060hPa	700 - 1060hPa

System Overview

System Graphics

The following are illustrations of the console:

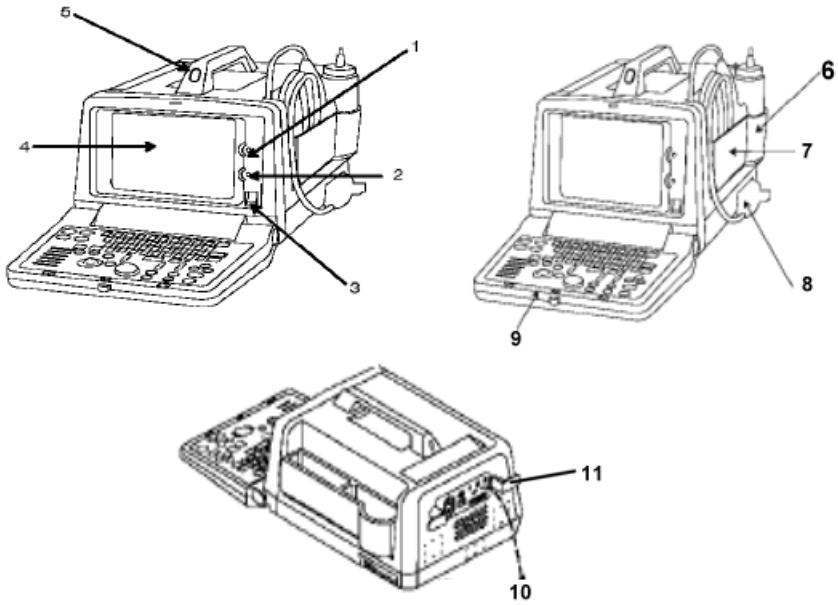


Figure 3-1. LOGIQ 100 PRO System

1. Brightness Rotary
2. Contrast Rotary
3. Power On/Off Switch
4. Monitor
5. Handle
6. Gel Holder
7. Probe Holder
8. Probe Connector
9. keyboard
10. Rear Panel
11. Cable Hook

Peripheral/Accessory Connection

Peripheral/Accessory Connector Panel

LOGIQ 100 PRO peripherals and accessories can be properly connected using the rear connector panel located behind the rear door.

CAUTION

Each outer (case) ground line of peripheral/accessory connectors are **Earth Grounded**.

Signal ground lines are Not Isolated.

CAUTION

For compatiblity reasons, use only GE approved probes, peripherals or accessories.

Be sure to plug the power supply cable of the peripherals to the connector panel of the system to avoid unexpected electrical shock.

DO NOT connect any probes or accessories without approval by GE.

CAUTION

The connection of equipment or transmission networks other than as specified in these instructions can result in electric shock hazard. Alternate connections will require verification of compatibility and conformity to IEC/EN 60601-1-1 by the installer.

Peripheral/Accessory Connector Panel (continued)

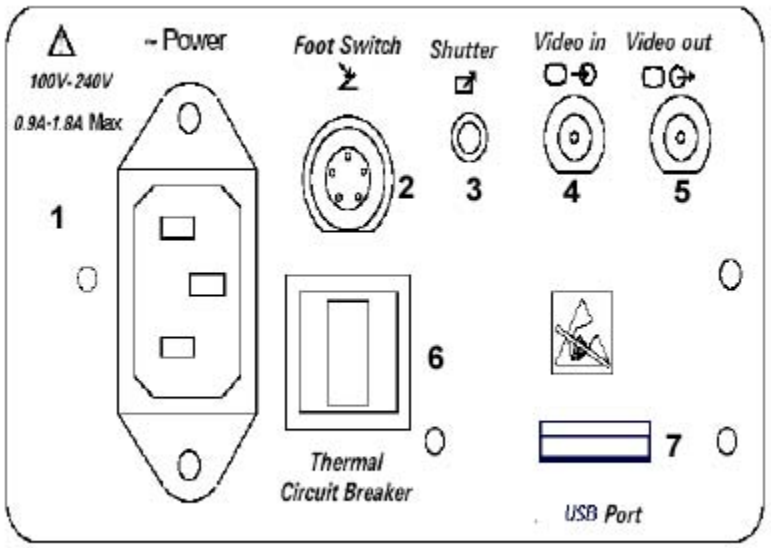


Figure 3-2. Rear Panel Connectors

1. Power Connector - for the power cord.
2. Foot Switch - connects optional foot switch.
3. Shutter - connects the VGP for remote operation.
4. Video in - Enables an external signal (VCR play back).
5. Video Out - Enables the connection of a video signal to external equipment Video graphic printer, VCR recording.
6. Thermal Circuit Breaker - The circuit breaker automatically shuts off power to the system in case power over load.
7. USB Port - diagnose the status of hardware boards connected to the system.

Footswitch (Option)

Use only the recommended optional multi-functional footswitch.

Figure 3-3. Footswitch

The foot switch, which is the remote FREEZE device, is connected to the rear panel of the system.

This extra FREEZE switch is provided to enhance flexibility to freeze image.

Two Probe Port (Option)

Use only the recommended optional two probe port.

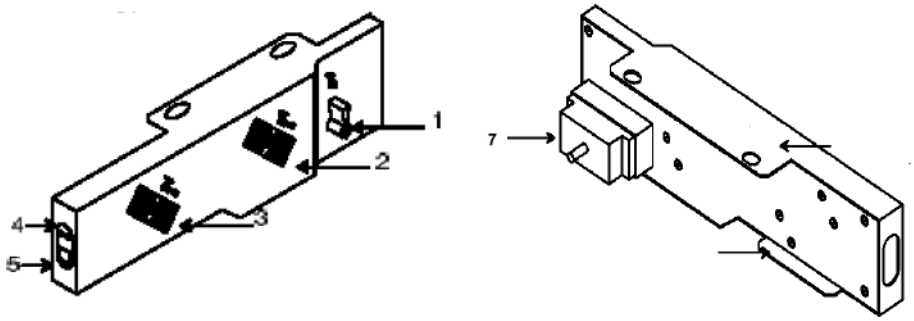


Figure 3-4. Two Probe Probe connector

1. Probe Lock
2. Probe Connector1
3. Probe Connector2
4. LED
5. Probe Change Switch
6. Two probe port connector

The two probe port is an option that serves as an interface to attach two probes to the single probe capable LOGIQ 100 PRO system. It enables users to switch between probes without disconnecting the probes.

The two probe port module can be connected or disconnected at any time regardless of whether the system is powered ON or OFF.

Two Probe Port (Option) (continued)

Follow the below instructions to attach two probe port:

- Remove the probe from the probe connector if any connected.
- Lift the probe holder vertically.
- Align the two probe connector with the system port and carefully push in place.
- Lock the two probe port by turning probe port lock in to 3 ‘O’ clock position.
- Replace the probe holder correctly.
- Connect the two probes in to the two probe connectors.

Actiavting the probe

To activate the probe:

- Press the Probe change switch on the two probe port to toggle between the two connected probes.
- The appropriate probe is activated and The LED toggles to indicate the probe change.

L200 Probe Adapter (Option)

Use only the recommended optional L200 probe adapter.

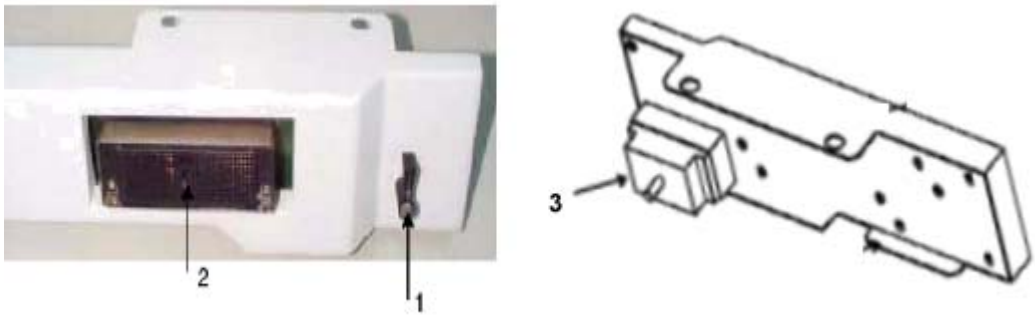


Figure 3-5. L200 Probe Adapter

1. Probe Lock
2. Probe Connector
3. L200 Probe Connector

The L200 Probe Adapter is an option that serves as an interface to attach L200 probes to the LOGIQ 100 PRO system.

Follow the below instructions to attach L200 probe adapter:

- Remove the probe from the probe connector if any connected.
- Lift the probe holder vertically.
- Align the L200 probe adapter with the system port and carefully push in place.
- Lock the two probe port by turning probe port lock in to 3 ‘O’ clock position.
- Replace the probe holder correctly.

System Positioning/Transporting

Moving the System

When moving or transporting the system, follow the precautions below to ensure the maximum safety for personnel, the system, and other equipment.

Before moving the system

1. Press the **Power On/Off** switch to power off. See ‘Power On’ on *page 3-19 for more information.*
2. Unplug the power cord.
3. All cables from off-board peripheral devices (external printer, external hard drive, etc.) must be disconnected from the console.
4. Disconnect the footswitch from the console.
5. Ensure that no loose items are left on the console.
6. Wind the power cable around cable hooks located on the rear panel.

Before moving the system (continued)

To prevent damage to the Power Cord, **DO NOT** pull excessively on the cord or make sharp bends while wrapping.

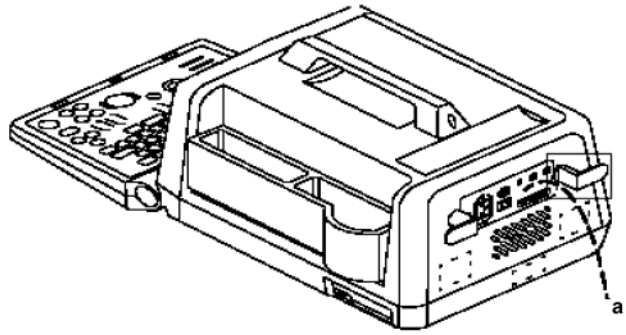


Figure 3-6. Location of hook

a. Hook

Before moving the system (continued)

7. Connect all probes to be used while off site.

NOTE: If more than two (2) probes are intended to be used, store the additional probes securely.

8. Store all other probes in their original cases or in soft cloth or foam to prevent damage.
9. Store sufficient gel and other essential accessories in the provided space.

Transporting the System

Use extra care when transporting the system using vehicles. In addition to the instructions used when moving the system (See ‘Moving the System’ on *page 3-12 for more information.*), also perform the following:

1. Keep the unit up right.
2. Prevent vibration damage by driving cautiously. Avoid unpaved roads, excessive speeds, and erratic stops or starts.

Powering the System

Connecting and Using The System

To connect the system to the electrical supply:

1. Ensure that the wall outlet is of the appropriate type.
2. Ensure that the power switch is turned off.
3. Unwrap the power cable. Make sure to allow sufficient slack in the cable so that the plug is not pulled out of the wall if the system is moved slightly.

Use the appropriate power cord provided by or designated by GE Healthcare.

4. Attach the power plug to the system and secure it in place by using the retaining clamp.
5. Push the power plug securely into the wall outlet.

Use caution to ensure that the power cable does not disconnect during system use.

If the system is accidentally unplugged, data may be lost.

Connecting and Using The System (continued)

WARNING

To avoid risk of fire, the system power must be supplied from a separate, properly rated outlet. See ‘Before the system arrives’ on *page 3-3 for more information.*

Under no circumstances should the AC power plug be altered, changed, or adapted to a configuration rated less than specified. Never use an extension cord or adapter plug.

To help assure grounding reliability, connect to a “hospital grade” or “hospital only” grounded power outlet.

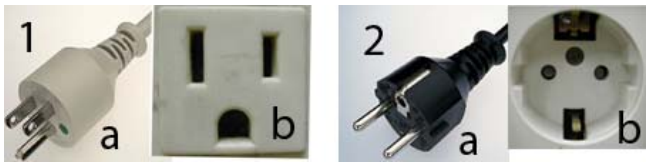


Figure 3-7. Example Plug and Outlet Configurations

1. 100 -120 VAC
2. 220-240 VAC

Acclimation Time

After being transported, the unit requires one hour for each 2.5 degree increment its temperature is below 10 degree C or above 40 degree C.

Table 3-2: System Acclimation Time Chart

Degree C	60	55	50	45	40	35	30	25	20	15	10
Degree F	140	131	122	113	104	95	86	77	68	59	50
hours	8	6	4	2	0	0	0	0	0	0	0
Degree C	5	0	-5	-10	-15	-20	-25	-30	-35	-40	
Degree F	41	32	23	14	5	-4	-13	-22	-31	-40	
hours	2	4	6	8	10	12	14	16	18	20	

Power On

Press the ***Power On/Off*** switch to turn the power on. The circuit breaker must also be in the on position. For circuit breaker location, See ‘Circuit Breaker’ on *page 3-22 for more information.*

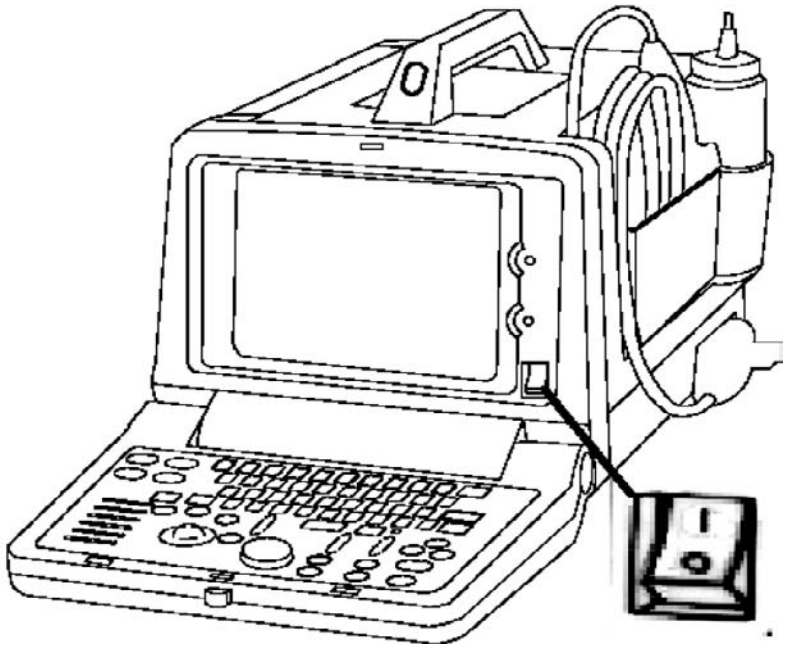


Figure 3-8. Power On/Off Location

a. Power On/Off Switch

Power Up Sequence

The system is initialized. During this time:

- The system boots up and the status is reflected on the monitor.

Figure 3-9. Power Up Graphic Sequence

HINTS

If problems occur, freeze the image and take a picture for reference. This will help if there is a need to call for service.

- Probes are initialized for immediate operation.

NOTE: If no probe is connected, the system goes into freeze mode.

After initialization is complete, all lighted buttons on the Control Panel light and the default B-Mode screen is displayed in the monitor display.

Power Off

To power off the system:

1. To shutdown the system, press the **Power On/Off** switch at the front of the system for 5 to 6 seconds.
2. Disconnect the probes.

   Clean or disinfect all probes as necessary. Store them in their shipping cases to avoid damage.
3. If daily maintenance is to be performed, turn off the circuit breaker.

NOTE: Do not pull the power cable without turning off the circuit breaker. For circuit breaker location, See 'Circuit Breaker' on page 3-22 for more information.

Circuit Breaker

The Circuit Breaker is located at the rear panel of the system. **On** supplies main power to all internal systems. **Off** removes main power from all internal systems. The circuit breaker automatically shuts off power to the system in case of a power overload.

If a power overload occurs:

1. Turn off all peripheral devices.
2. Switch OFF the main power switch to the console.
3. Reactivate the Circuit Breaker switch.

*NOTE: If the Circuit Breaker switch does **not** remain in the **On** position or trips again:*

1. Disconnect the power cord.
2. Call Service immediately

DO NOT attempt to use the system.

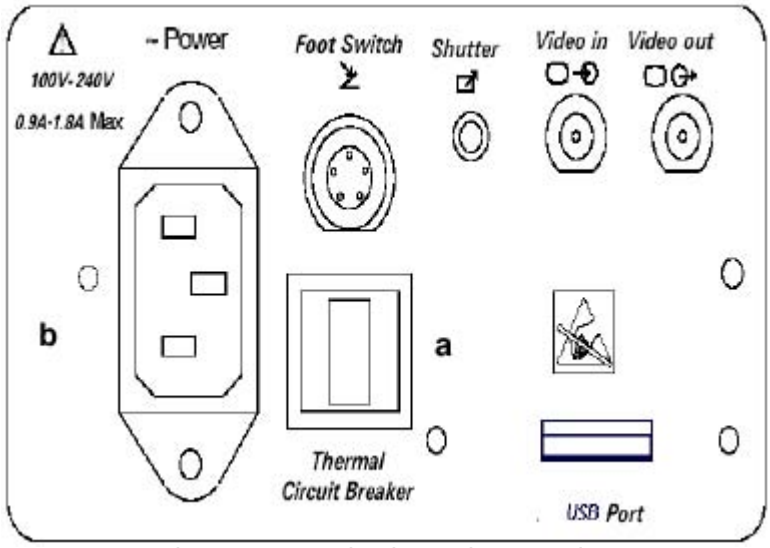


Figure 3-10. Circuit Breaker Location

a. Circuit Breaker
b. Power Connector

Adjusting the Display Monitor

Brightness and Contrast

Adjusting the monitor's contrast and brightness is one of the most important factors for proper image quality. If these controls are set incorrectly, the Gain, TGC, Dynamic Range and even Power Output may have to be changed more often than necessary to compensate.

The proper setup displays a complete gray scale. The lowest level of black should just disappear into the background and the highest white should be bright, but not saturated.

To adjust the brightness:

a. Turn the CONTRAST Rotary pot,which is positioned on the inclined face of the front panel,clockwise or counterclockwise to get a sharp image and a complete range of gray shades.The lowest level of block should just disappear into the background and highest white should be bright but not saturated.

b. Similarly,turn the BRIGHTNESS Rotary pot,Which is Positioned above the contrast rotary Pot,Clockwise or Counter clockwise to increase the brightness until the background is just one shade above black.

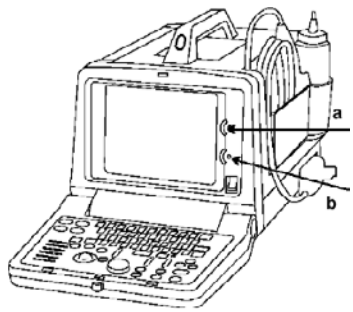


Figure 3-11. Monitor Screen

Probes

Introduction

Use Only approved probes. All Imaging probes can be plugged into any of the two standard probe port. Probes can be connected or disconnected from the system at any time regardless of whether the LOGIQ 100 PRO system is powered ON/OFF.

Connecting a Probe

Probes can be connected at any time, regardless of whether the console is powered on or off. To ensure that the ports are not active, place the system in the image freeze condition.

To connect a probe:

1. Place the probe's carrying case on a stable surface and open the case.
2. Carefully remove the probe and unwrap the probe cord.
3. DO NOT allow the probe head to hang free. Impact to the probe head could result in irreparable damage. Use the integrated cable management hook to wrap the cord.

   Inspect the probe before and after each use for damage or degradation to the housing, strain relief, lens, seal and connector. DO NOT use a transducer which appears damaged until functional and safe performance is verified. A thorough inspection should be conducted during the cleaning process.

Connecting a Probe (continued)

4. Turn the connector locking handle counterclockwise.
5. Align the connector with the probe port and carefully push into place.

   Before inserting the connector into the probe port, inspect the probe connector pin. If the pin is bent, do not use the probe until it has been inspected and repaired/replaced by a GE Service Representative.
6. Turn the connector locking handle clockwise to secure the probe connector.
7. Carefully position the probe cord so that it is free to move and is not resting on the floor
8. When the probe is connected, it is automatically activated.

Cable Handling

Take the following precautions with probe cables:

- Do not bend the cable acutely
- Avoid crossing cables between probes.

Disconnecting a Probe

Probes can be disconnected at any time. However, the probe should not be active when disconnecting the probe.

To disconnect a probe:

1. Ensure the probe is deactivated. Deactivate by selecting another probe or pressing Freeze.
2. Move the probe locking handle counterclockwise.
3. Pull the probe and connector straight out of the probe port.
4. Carefully slide the probe and probe connector away from the probe port and around the right side of the keyboard.
5. Ensure the cable is free.
6. Be sure that the probe head is clean before placing the probe in its storage box or a wall hanging unit.

Storing the Probe

It is recommended that all probes be stored in the provided carrying case or in the wall rack designed for probe storage.

Carrying case:

- First place the probe connector into the carrying case.
- Carefully wind the cable into the carrying case.
- Carefully place the probe head into the carrying case. DO NOT use excessive force or impact the probe head.

Operator Controls

Operator Panel Map

Controls are grouped together by function for ease of use. See the callouts for this figure on the following page.

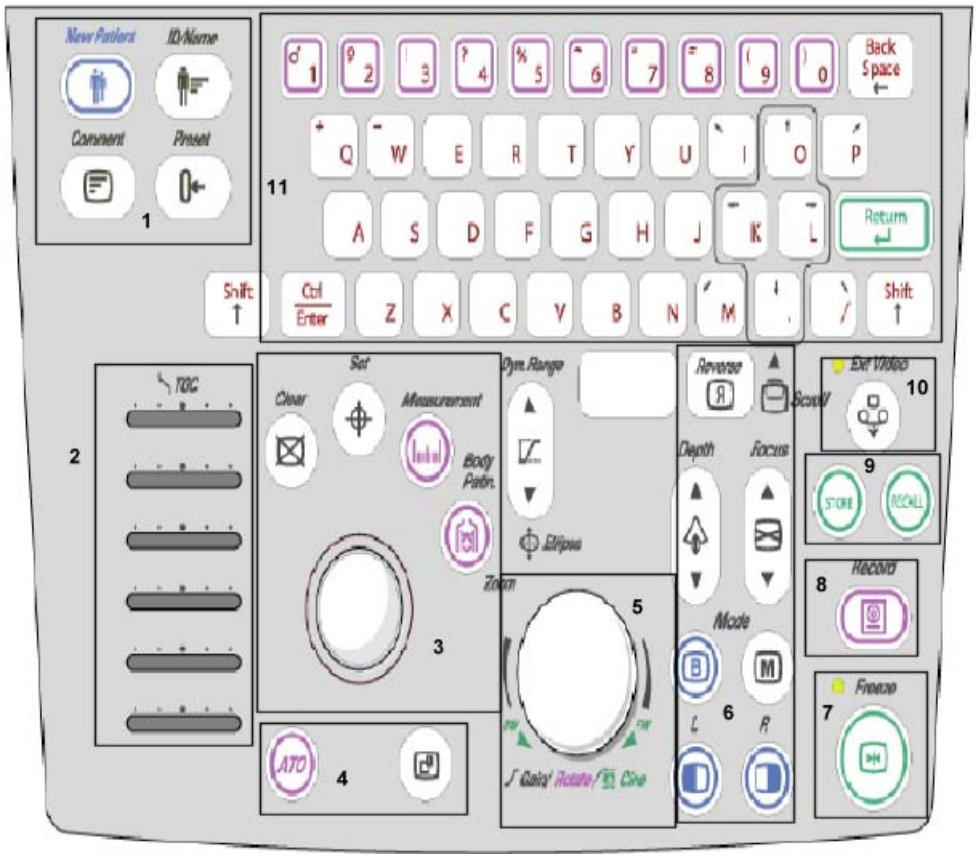


Figure 3-12. Operator Panel

Operator Panel Map (continued)

1. Function Keys (New Patient, ID/Name, Comment, and Preset)
2. TGC
3. Measurement Keys
4. Auto, Zoom keys
5. Gain/Cine Control
6. Imaging keys.
7. Freeze Key
8. Record Key
9. Archive Keys
10. External Video

Function Keys

Patient

Enters Patient screen.

To avoid patient identification errors, always verify the identification with the patient. Make sure the correct patient identification appears on all screens and hard copy prints.

ID/Name

Pressing ID/NAME allows modification of patient data without erasing patient image, measurements, calculations and summary reports.

Comment

The Comment key enables the image text editor. Use the Trackball and Spacebar to move the cursor.

PRESET

Press PRESET to select the default scan parameters stored for the probe connected. Parameter scan be predefined using the Control-W function.

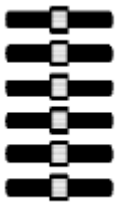
Mode, Display and Record

Gain

The GAIN/ROTATE knob adjusts the amplification of the returning echoes in both B and M–Modes.

When the image is frozen, this knob activates the cine memory and can be used to move around the cine gauge. When the image is frozen and ‘body pattern’ is selected it rotates the probe marker for body pattern

TGC Controls



Used to vary the gain of the received echoes at a specific depth.

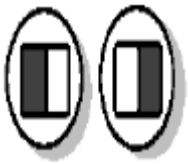
B-Mode

Activates B-Mode format.

M-Mode

Toggles between B/M and M-Mode formats.

Dual B-Mode



During dual display modes the **L** and **R** keys activate the Left or Right displayed image.

ATO (AO)

Used to optimize the tissue images in image scan area.

Zoom

Zoom is used to enlarge the ROI (Region Of Interest) of the image.

Mode, Display and Record (continued)

Reverse

The Reverse key toggles the left/right orientation of the scan image.

Freeze

The Freeze key is used to stop the acquisition of ultrasound data and freeze the image in system memory. Pressing ***Freeze*** a second time continues live image data acquisition.

Dynamic Range

DYNAMIC RANGE adjusts the intensities of returning echoes.

Scroll Key

Scroll enables scrolling the live image Left/Right, Up/Down on the BMode Format.

Body Pattern

Press Body Pattern to select a body pattern from the currently active body pattern package.

Pressing the Body Pattern key at the end of each menu (Either Abdomen/Urology/SP/CD or OB/GYN) takes you to the next Body Pattern Package automatically.

Mode, Display and Record (continued)

External Video

EXTERNAL VIDEO enables an external video signal (VCR playback) to be viewed on the LOGIQ 100 PRO system monitor.

Back Space

BACK SPACE erases individual characters to the left of the cursor while entering alphanumeric information.

Record Key

RECORD prints the images or report pages on Video Graphic Printer.

Return Key

Return Key moves the cursor next line or next field.

Control/Enter Key

CONTROL/ENTER activates all control functions.

Store Key

STORE key stores the images.

Recall Key

RECALL key recalls the stored images.

Measurement and Annotation

Clear

The Clear key is generally used to erase functions, such as annotations/comments, body patterns and measurements. Pressing the Clear key again exits the selected function.

Measurement

The Measure key is used in all types of basic measurements. It also becomes the “mouse” arrow for making selections along with the Set key (to fix or finish a selection). When the Measure key is pressed, the measurement is displayed.

Depth Key

The Depth controls the image display depth.

Focus Key

FOCUS enables the selection of the optimal focal depth for transmit.

Set

The Set key is used for various functions, but is generally used to fix or finish an operation (e.g. to fix a measurement caliper).

Trackball

The Trackball is used with almost every key function in this group. Trackball control depends on the last key function pressed.

Image Display

Overview

The LOGIQ 100 PRO system offers a variety of display formats. Each format shows the operator valuable information relating to patient data and system scan parameters.

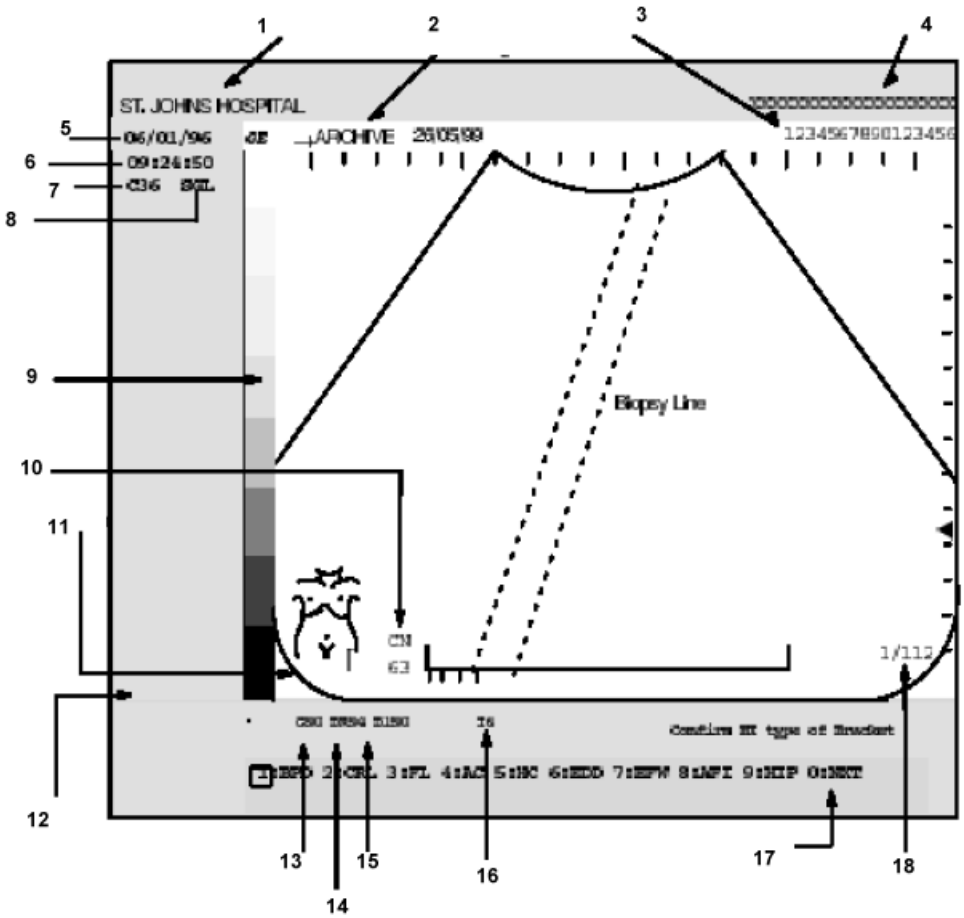


Figure 3-13. Monitor Display

Image Display (continued)

1. Institution/Hospital Name
2. Image Archive Information.
3. Patient ID.
4. Patient Name.
5. Date.
6. Time.
7. Probe.
8. Biopsy.
9. Gray Bar.
10. Cine Status.
11. Body Pattern.
12. Calculation Area.
13. Gain.
14. Dynamic Range.
15. Depth.
16. Print out status.
17. Main Menu.
18. Archive Memory Status.

Chapter 4

Preparing for an Exam

Describes how to begin an exam.

Beginning an Exam

Introduction

Begin an exam by entering new patient information.

The operator should enter as much information as possible, such as:

1. Patient ID
2. Patient Name

The patient's name and ID number is retained with each patient's image and transferred with each image during archiving or hard copy printing.

CAUTION

To avoid patient identification errors, always verify the identification with the patient. Make sure the correct patient identification appears on all screens and hard copy prints.

Beginning a New Patient

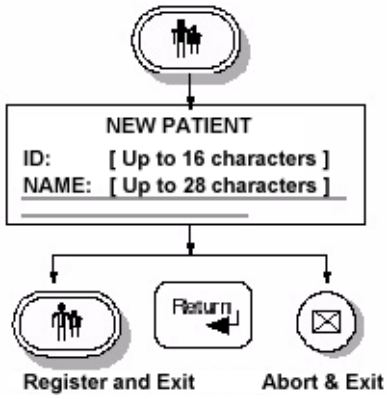


Figure 4-1. Patient Entry Menu

Pressing the Patient key on the Operator Panel displays the Patient screen on the monitor.

- Enter Patient Identification (16 characters) using alphanumeric keys,
- Press RETURN to go to the Patient Name field (28 characters).

  Enter Patient Name.
- Press RETURN or NEW PATIENT to register the inputs and exit out of the menu (or)

  Press CLEAR to exit NEW PATIENT and abort entry if required.

NOTE: To modify only Patient Information with out erasing other data, Press the ID/NAME key. Pressing ID/NAME allows modification of patient data without erasing patient image, measurements, calculations, and summary reports.

Exam Category Selection

Select from 7 exam application categories:Abdomen, Obstetrics, Gynecology, Cardiology, Urology, Small Parts, and User Defined.

Exam Category Selection (continued)

The Exam Category can be selected using the CONTROL D. Follow the below instructions to select any one of available exam categories.

- Press “Control” D.
- Select any of the following options.
  - 1 for abdomen
  - 2 for Obstetrics
  - 3 for Gynecology
  - 4 for Cardiology
  - 5 for Urology
  - 6 for Small Parts
  - 7 for User Defined
- Press “Control” key to invoke selected exam category.

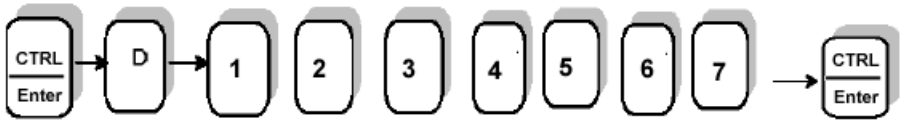


Figure 4-2. Exam Category Selection

Scanning a New Patient

- Position the patient in a lying down position and apply Acoustic gel to the probe and on the patient. Position the transducer on the patient, adjust the imaging controls to produce a high quality image.
- Begin the scan on the patient.
- A realtime image appears on the monitor through the following controls:
  - Orient the probe on the patient based on the study to be performed or view to be obtained.
  - Increase or decrease the overall **Gain**, **TGC** and ***Dynamic Range*** to obtain the desired Image quality.
  - If the image is not bright, increase the overall **Gain** until the appropriate brightness is obtained. The amplitude of returning echoes should be optimally displayed.
  - Increase ***Dynamic Range*** to get a smoother image.
  - Decrease ***Dynamic Range*** to get an image with more contrast.
  - Position the Focus marker in the area of interest.
- Press **Freeze** to stop image acquisition.
- Refer to the General Measurements chapter for details on making generic measurements.
- Enter comments on the image area, if required, by pressing the **Comments** key.
- Use Record key to print the image on VGP/HP Laserjet or to store the image permanently.

Helpful Hints

HINTS

If power is lost while entering new patient data, data will not be saved.

The following rules apply when filling in data on the new patient menu.

- Press ***Caps Lock*** to type uppercase letters. Press ***Caps Lock*** again to type lowercase letters.
- Press ***Back Space*** to erase characters and correct errors.
- Use the **Trackball** to move the cursor to the desired item.
- When pressing the **Set** key at the EXIT field, the system returns to B-Mode live scanning.
- To start over, press **New Patient**.

NOTE: User and factory-dependent presets are dependent upon the exam category selected when filling the new patient menu.

Chapter 5

Optimizing the Image

Describes how to adjust the image. This chapter is broken into the following sections: B-Mode, B/B-Mode, B/M-Mode and M-Mode.

Optimizing B-Mode

Intended Uses

B-Mode is intended to provide two-dimensional images and measurement capabilities concerning the anatomical structure of soft tissue.

Figure 5-1. B-Mode Display

Typical B-Mode Exam Protocol

A typical examination using B-Mode might proceed

1. Record exam-related patient information. Verify system configuration (probes and presets).
2. Position the patient and the console for optimum operator and patient comfort. Perform the scan.
3. Complete the study by collecting all the data.

B-Mode Scanning Hints

These B-Mode controls produce the following results:

Auto Optimize: Improves imaging performance while reducing optimization time. Available in B-Mode.

Frequency: Changes system parameters to best optimize for a particular patient type.

Gray Map: Affects the presentation of B-Mode information. Choose the gray map prior to making other adjustments. There is an interdependency between gray maps, gain, and dynamic range. If you change a map, revisit gain and dynamic range settings.

Dynamic Range: Affects the amount of gray scale information displayed. If you increase the gain, you may want to decrease the Dynamic Range.

Edge Enhance: Affects the amount of border crispness.

Frame Average: Smooths the image by averaging frames. Affects the amount of speckle reduction.

TGC: Adjust TGC to adjust Gain in specific areas.

Focus position: The best focusing is at the focal zone location. Put focal zone(s) at the area of interest. Be conscious of where the focal zones are. Focal zones must be moved to track at the center of the anatomy of interest.

Image Softner: Image softner brings out the differences on the image by softening the gray scale..

Depth

Description

Depth controls the distance over which the B-Mode images anatomy. To visualize deeper structures, increase the depth. If there is a large part of the display which is unused at the bottom, decrease the depth.

Adjusting

Each adjustment cycles you to the next Depth setting. Imaging and display parameters adjust automatically.

To increase/decrease, adjust **Depth**.

Values

Depth increments vary by probe and application. Depth displays on the monitor in centimeters.

Benefits

Depth adjusts your field of view. It increases your field of view to look at larger or deeper structures; it decreases your field of view to look at structures near the skin line.

Affect on other controls

After adjusting the depth, you may need to adjust the **TGC** and focus.

Changing Depth,

- Clears Cine memory.
- Erases realtime calculations graphics on the display (but not the completed results on the worksheet page).

HINTS

Make sure enough space is left below the anatomy of interest to demonstrate shadowing or enhancement.

Gain

Description	B-Mode Gain increases or decreases the amount of echo information displayed in an image. It may have the effect of brightening or darkening the image if sufficient echo information is generated.
Adjusting	Gain values vary depending on the probe; they are not associated with a particular position of the knob. To decrease/increase, rotate **Gain**.
Values	Gain displays on the monitor in Gn (dB).
NOTE:	*Maximum gain is factory preset to an optimum setting to eliminate noise in the display.*
Benefits	Gain allows you to balance echo contrast so that cystic structures appear echo-free and reflecting tissue fills in.
Affect on other controls	Gain and TGC interact by adding together.

Focus

Description	Increases the number of focal zones or moves the focal zone(s) so that you can tighten up the beam for a specific area. A graphic caret corresponding to the focal zone position(s) appears on the right edge of the image.
Adjusting	To move the focal zone to the near/far field, adjust Focus Position.
NOTE:	*Each adjustment cycles you to the next setting.*
Values	Focus zone number and position vary depending on the depth, zoom, probe, application, and frequency setting selected.
Benefits	Focus optimizes the image by increasing the resolution for a specific area.
Affect on other controls	Changing the focal number affects the frame rate. The greater number of focal zones, the slower the frame rate.

Automic Tissue Optimization (ATO)

Description ATO lets you optimize the image based upon a specified region of interest or anatomy within the B-Mode image in order to improve the contrast of the displayed image data. Auto Optimize is available in B-Mode, specifically in single or multi image, on live images and while in zoom.

NOTE: Auto is not available on archived images.

Adjusting To activate/dactivate, press the **AO** key.

NOTE: When ATO is active, the probe orientation marker is highlighted.

Values Auto Optimize is active until you deactivate it.

Affect on other controls You may need to adjust the Gain.

TGC

Description TGC amplifies returning signals to correct for the attenuation caused by tissues at increasing depths. TGC slide pots are spaced proportionately to the depth. The area each pot amplifies varies as well. A TGC curve may appear on the display (if preset), matching the controls that you have set (except during zoom). You can choose to deactivate the TGC curve on the image.

Adjusting To decrease/increase TGC, move slide pot to the left/right.

NOTE: TGC adjusts automatically when using zoom. The TGC curve does not change while in CINE.

Values When you change the depth, TGC is rescaled across the new depth range. Each pot is proportionately scaled across the depth.

Benefits TGC balances the image so that the density of echoes is the same throughout the image.

Reverse

Description Flips the image 180 degrees left/right.

Adjusting To flip the image 180 degrees, select Reverse.

Values The image rotates in 180 degrees left/right. Reverse settings vary by probe and application.

Benefits Used for anatomical correctness.

When reading a reverse image, be careful to observe the probe orientation to avoid possible confusion over scan direction or left/right image reversal.

Inverse

Description Flips the image 180 degrees up/down.

Adjusting To flip the image 180 degrees up/down:

- Press “SHIFT” + Reverse.
- The image rotates in 180 degrees up/down.

Values The image rotates in 180 degrees up/down. Invert settings vary by probe and application.

Benefits Used for anatomical correctness.

When reading a invert image, be careful to observe the probe orientation to avoid possible confusion over scan direction or up/down image inversion.

Dynamic Range

Description	Dynamic Range controls how echo intensities are converted to shades of gray, thereby increasing the adjustable range of contrast. The Dynamic Range control name changes to Compression on frozen images.
Adjusting	To increase/decrease, adjust Dynamic Range.
Values	The settings cycle in 6dB steps from 30 dB to 72 dB. The current value displays. Dynamic Range values vary by probe, application, and frequency settings. Dynamic Range levels are returned to the factory or user preset value when you change the following: Probe, Exam Category, Exam Calcs, New Patient, or Multi Frequency.
Benefits	Dynamic Range is useful for optimizing tissue texture for different anatomy. Dynamic Range should be adjusted so that the highest amplitude edges appear as white while lowest levels (such as blood) are just visible.
Affect on other controls	Dynamic range operates only in realtime, not in Freeze or CINE. It also affects Gain.

Edge Enhance

Description

Edge Enhance brings out subtle tissue differences and boundaries by enhancing the gray scale differences corresponding to the edges of structures. Adjustments to M-Mode's edge enhancement affects the M-Mode only.

Adjusting

To cycle through settings, adjust Edge Enhance:

Figure 5-2. Edge Enhance Selection

- Press “Control” I.
- Select the intensity(0,1,2,3) of Edge Enhance.

NOTE: By default the Edge Enhance is set to 2(Mid)

- Press “Control” key to affect the changes.

Values

Off, Low, Med, and High. The current value displays on the . Values vary by probe, application, and multi frequency setting. Values are returned to the preset value when you change: Probe, Exam Category, Exam Calcs, New Patient, or Multi Frequency.

Benefits

Edge Enhance cleans out the B-Mode image/M-Mode timeline by subduing some of the gray scale in order to highlight the vessel wall or organ. This is helpful when you cannot differentiate between the chambers of the heart.

Affect on other controls

Edge Enhance operates in realtime only; not in Freeze or CINE.

Frame Average

Description Temporal filter that averages frames together, thereby using more pixels to make up one image. This has the effect of presenting a smoother, softer image.

Adjusting To adjust frame averaging, adjust Frame Average:

Figure 5-3. Frame Average Selection

- Press “Control” A.
- Select the average value.
  - 0 for Frame Average off.
  - 1 for 25%
  - 2 for 50%
  - 3 for 75%
- Press “Control” key to affect the changes.

Values Frame Average values vary by probe, application, and multi frequency setting.

Benefits Smooths the image.

Multi Frequency

Description Multi Frequency mode lets you downshift to the probe's next lower frequency or shift up to a higher frequency.

Adjusting To select a new frequency,

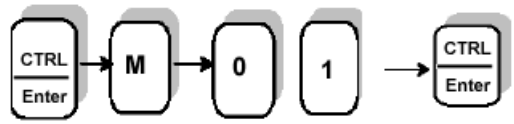


Figure 5-4. Multi Frequency Selection

- Press “Control” M .
- Select the desired frequency by using numeric keys.
- Press “Control” key to affect the changes.

NOTE: Frequency change is not active when the image is frozen.

NOTE: Changing frequency resets those parameters which are presettable by frequency to their preset values for the current frequency.

Values Vary, depending on the probe.

Benefits This optimizes the probe's wide band imaging capabilities at multiple frequencies to image at greater depths.

Image Softner

Description Image softner brings out the differences on thye image by softening the gray scale.

Adjusting To adjust frame averaging, adjust Image Softner:

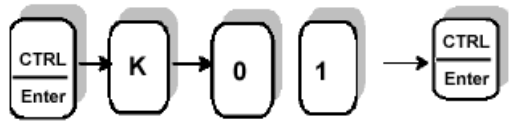


Figure 5-5. Image Softner Selection

- Press “Control” K.
- Select the image softner value.
  - 0 for off.
  - 1 for on.
- Press “Control” key to affect the changes.

Values Image Softner values vary by probe, application, and multi frequency setting.

Benefits Softening the image.

Optimizing B/B-Mode

B/B-Mode

Press the **L/R** key to display dual B-Modes to find the shapes of an organs. Press the **L** key to activate the left image. When the **R** key is pressed, the right image becomes active while freezing the left image and vice versa. Press the B-Mode key to return to a single B-Mode display.

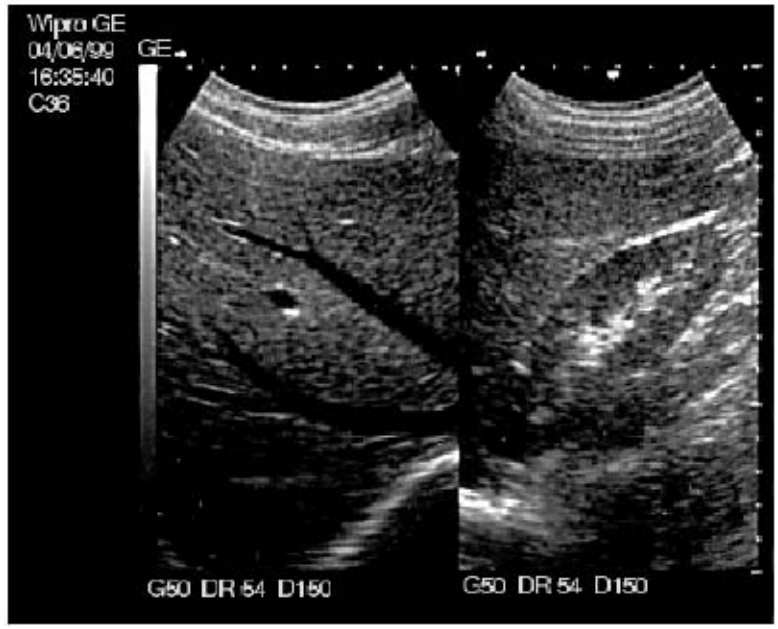


Figure 5-6. Dual Image Display

NOTE: When L/R images are frozen by the Freeze key, the L/R keys cannot unfreeze the two images.

Optimizing M-Mode

Intended Use

M-Mode is intended to provide a display format and measurement capability that represents tissue displacement (motion) occurring over time along a single vector.

Introduction

M-Mode is used to determine patterns of motion for objects within the ultrasound beam. The most common use is for viewing motion patterns of the heart.

Typical exam protocol

A typical examination using M-Mode might proceed as follows:

1. Get a good B-Mode image. Survey the anatomy and place the area of interest near the center of the B-Mode image.
2. Press M-Mode.
3. Adjust the Sweep Speed, TGC, Gain, and Focus Position as needed.
4. Trackball to position the mode cursor over the area that you want to display in M-Mode.
5. Press **Freeze** to stop the M trace.
6. Record the trace to the internal memory by pressing either the **P1**/**P2** key (programmable through the System Configuration screen) or to the hard copy device.
7. Press **Freeze** to continue imaging.
8. To exit, press B-Mode.

M-Mode Display

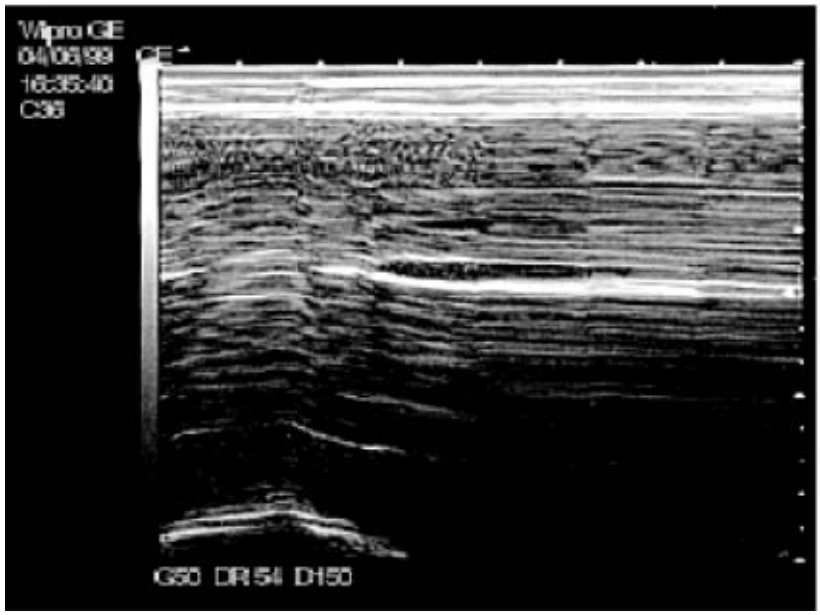


Figure 5-7. M-Mode Display

Optimizing B/M-Mode

B/M-Mode

LOGIQ 100 PRO supports a combination of brightness mode and Motion mode. Press the M-Mode key to acquire a B/M-Mode image from the B-Mode image. The B-Mode image appears on the left side and the M-Mode image appears on the right side. Use the Trackball to move the M-line on the B-Image to get the corresponding M-Image display. Press the B-Mode key to return to the original display.

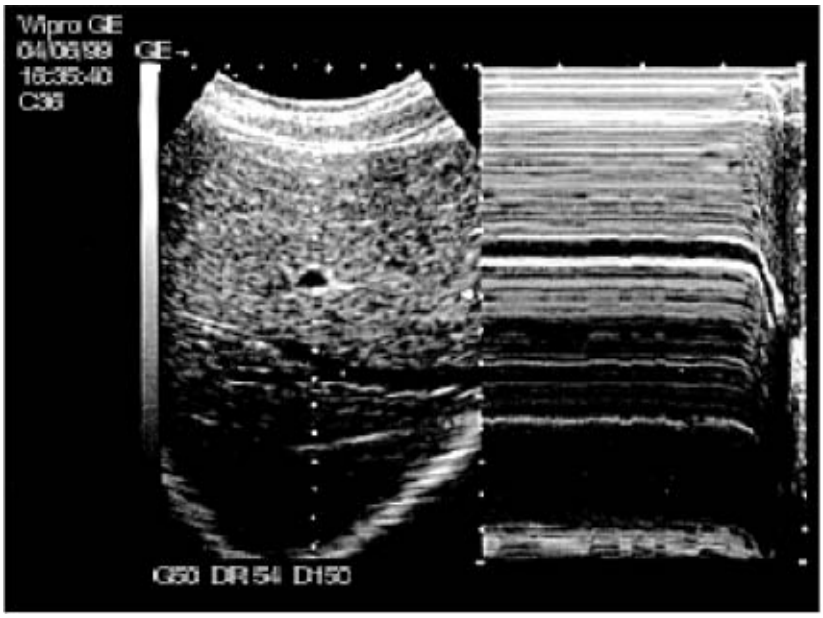


Figure 5-8. B/M-Mode Display

NOTE: When the B-Mode key is pressed in B/M Mode, the system returns to B-Mode while retaining current scan values. It erases measurements. Dynamic Range and Gain Control adjustments affect the M-Mode image as well as the B-Mode image.

Quad Image

Quad Image

Press the A,S,D,F alphanumeric keys while in B or B/B imaging modes to display Quad B- Mode images.

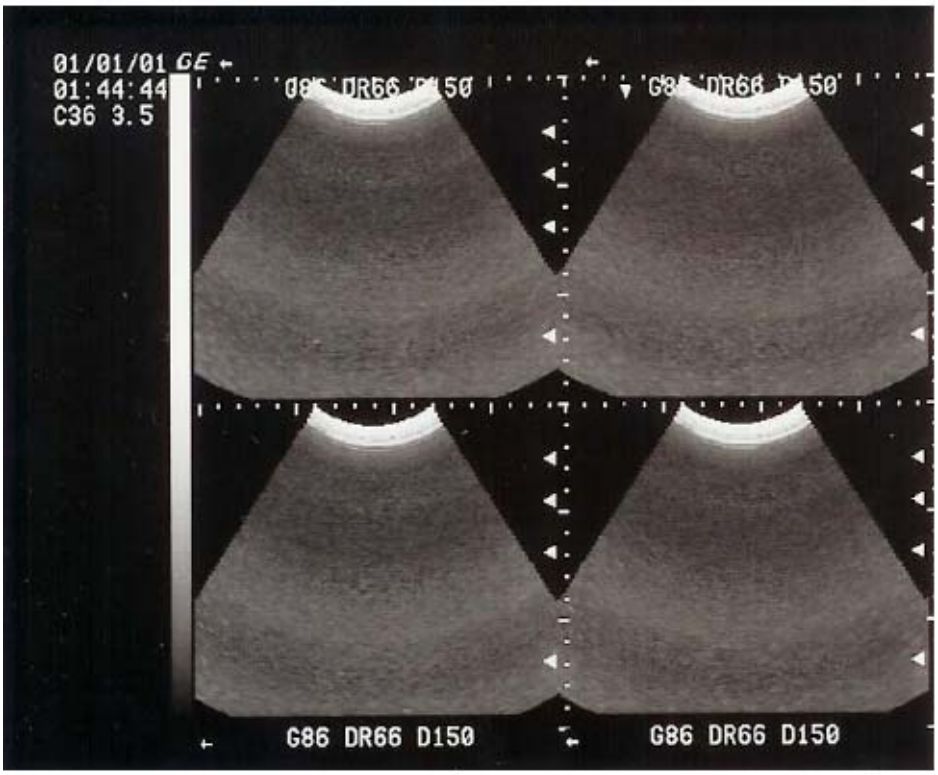


Figure 5-9. Quad Image Display

Quad Image (continued)

- When the A alphanumeric key is pressed,the top left image becomes active.
- When the S alphanumeric key is pressed,the top Right image becomes active
- When the D alphanumeric key is pressed,the Bottom left image becomes active
- When the F alphanumeric key is pressed,the Bottom Right image becomes active

Only one image among the four will be live at a given time, Other three will be in Frozened Mode

Press the B-Mode key to return to a single B-Mode display

Chapter 6

Scanning/Display Functions

Describes additional ways in which to adjust the image. In addition, describes additional ways to get useful information electronically.

Zoom

Introduction

Zoom is used to magnify an image. The magnification factor for zoom is fixed at 2. The system adjusts all imaging parameters accordingly.

To magnify an image, press Zoom. The zoomed image appears at the default location of image area. Move the Trackball to the Region of Interest (ROI). The zoomed image is updated dynamically.

Press Clear or Zoom to deactivate the zoom functionality while in zoom.

NOTE: No Measurements can be performed on zoomed images.

Freezing Image

Introduction

Freezing a real-time image stops all movement and allows you to measure and print the image.

This allows for measurements, annotations and printing or storage into temporary image memory.

NOTE: While the image is frozen, all Power Output is suspended.

NOTE: Selecting a new probe unfreezes the image.

Freezing an Image

To freeze an image:

- Press Freeze.

  If you are in a mixed mode, both screen formats stop immediately. Deactivating Freeze restarts both modes and places a black bar on the trace to indicate the time discontinuity.

To reactivate the image:

- Press Freeze again.

NOTE: Deactivating Freeze erases all measurements and calculations from the display (but not from the report page).

Freezing an Image (Footswitch Option)

You can also freeze the image via the footswitch.

CINE

Overview

Cine images are constantly being stored by the system and are available for playback or manual review via CINE.

Timeline data is constantly being stored in ten second intervals.

CINE images can be viewed frame by frame via CINE Gauge or through a CINE loop.

CINE is useful for focusing on images during a specific part of the heart cycle or to view short segments of a scan session.

CINE memory is erased when changing the following: probe or scan mode.

Post Processing functions can be performed while in CINE, for example: Measurements, Calculations, Annotations and Body Patterns.

To exit a CINE image:

- Unfreeze the image by changing the mode or pressing **Freeze**.

Activating CINE

To activate CINE:

- Press **Freeze**.
- Rotate the B/M Gain/Cine Scroll knob to activate Cine.
- Rotate the Cine Scroll dial left(backward) and right(forward) to move through the images in Cine Memory.
- The Current frame on the Cine gauge moves and the Cine frame number is displayed on the left side of the screen.

NOTE: Provision for storing 64 display memory frames is provided.

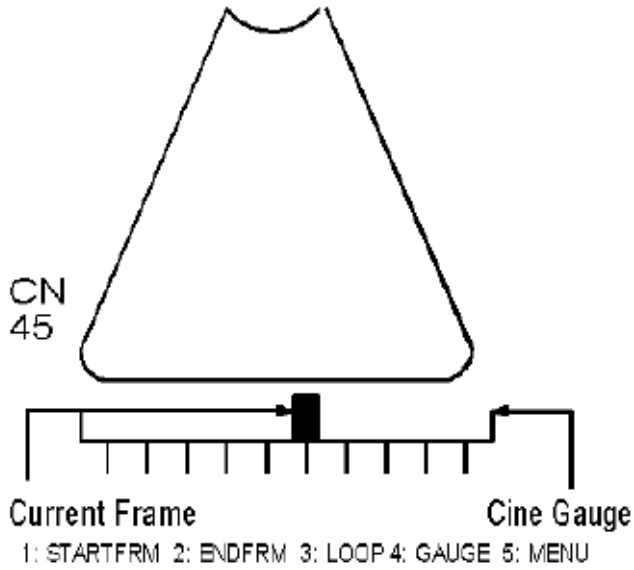


Figure 6-1. CINE Image

CINE Gauge

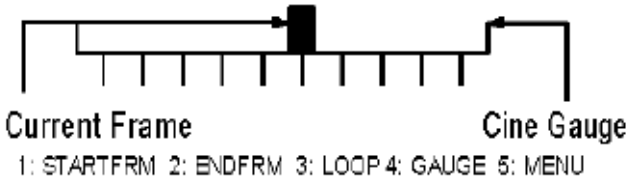


Figure 6-2. Cine guage

Press 4 to toggle the cine gauge on or off.

Select any desired cine frame by rotating the Gain/Rotate/Cine knob. A Cine Loop can be created so that the cine frame moves from start point to end point.

- Press 1(Startframe). Move the cursor to the desired start frame and press 1(startframe) again.
- Press 2(Endframe). Move the cursor to the desired frame and press 2(Endframe) again.
- Press 3(Loop) to replay the cine frame.
- Press 4 to Turn Off/On Cine Gauge.
- Press 5 to Turn Off/On Cine Menu.

Annotating an Image

Introduction

The comment function provides the capability to type the comments of free text and/or insert the pre-defined comments from the comment library.

Pressing the **Comment** key initiates the comment mode. This assigns the trackball function to controlling the cursor and allows comments to be entered via the keyboard.

- Press ***Enter*** to move to the next line.
- Use ***Back Space*** to erase individual characters to the left of the cursor.
- Moving the **Trackball** moves the cursor to a different location on the screen.

  Pressing CONTROL-C sets home position of cursor.
- Erase all annotations by invoking “New Patient” or by pressing the **Clear** key.
- Press **Comment** again to terminate the comment mode.

Annotation Library

Press the SHIFT+A keys to select annotations library menu.

An Annotation Library is available with a total of 69 annotations. Each Diagnostics category has a different set of annotations.

a. Abdomen has 2 sets of annotations
b. OB has 4 sets of annotations
c. Gyn has 2 sets of annotations
d. Cardiac has 2 sets of annotations
e. Urology has 2 sets of annotations
f. Small Parts has 4 sets of annotations

The appropriate exam category comment menu replaces the Top Menu. Press the appropriate corresponding numeric key to display the annotation on the image.

On pressing the numeric keys the desired annotation can be selected from the Top Menu and displays the selected annotation on the screen.

The alphanumeric key 'A' can also be used to sequentially go through each text in the list. On reaching the last annotations of the list by using the Alphanumeric Key 'A', the next set of annotation list of that diagnostic category can be selected.

Abdomen Annotation List

Figure 6-3. Abdomen Annotation Top Menu

1. Pancreas
2. Gall Bladder
3. Spleen
4. IVC
5. Liver

Figure 6-4. Abdomen Annotation Top Menu

1. Adrenal
2. Renal Pelvis
3. Ureter
4. Bladder

Obstetrics Annotation List

Figure 6-5. Obstetrics Annotation Top Menu

1. 4 Chamber Heart
2. MVr
3. TV
4. Plum Valve
5. AV
6. Apical 4 Chamber

Figure 6-6. Obstetrics Annotation Top Menu

1. Uterus
2. Endometrium
3. Gest Sac
4. Yolk Sac
5. Placenta

Figure 6-7. Obstetrics Annotation Top Menu

1. Uterus
2. Endometrium
3. Gest Sac
4. Yolk Sac
5. Placenta

Figure 6-8. Obstetrics Annotation Top Menu

1. Spine
2. 4 Chamber Heart
3. Cervix
4. Femur

Gynecology Annotation List

Figure 6-9. Gynecology Annotation Top Menu

1. Uterus
2. Endometrium
3. Dominant Follicle
4. Bladder
5. Ovum

Figure 6-10. Gynecology Annotation Top Menu

1. Free Fulid
2. Bowel

Cardiology Annotation List

Figure 6-11. Cardiology Annotation Top Menu

1. MV
2. AoV
3. TV
4. IVS
5. PV
6. IVC
7. Aorta

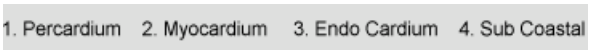


Figure 6-12. Cardiology Annotation Top Menu

1. Percardium
2. Myocardium
3. Endocardium
4. Sub Coastal

Urology Annotation List

Figure 6-13. Urology Annotation Top Menu

1. Semvesicle
2. Fibromusc Stroma
3. Small List
4. Bladder

Figure 6-14. Urology Annotation Top Menu

1. Urethera
2. Rectum

Small Parts Annotation List

Figure 6-15. Small Parts Annotation Top Menu

1. Nipple
2. Lymphnode
3. Radial
4. Antiradial
5. Axillarytrail

Figure 6-16. Small Parts Annotation Top Menu

1. Spermcord
2. Epididymmis
3. Small List
4. Varicocele

Figure 6-17. Small Parts Annotation Top Menu

1. Bowel
2. Medistinum
3. Hernia
4. Trachea
5. Node

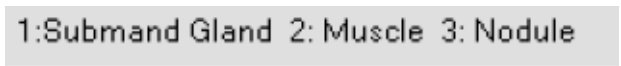


Figure 6-18. Small Parts Annotation Top Menu

1. Submand Gland
2. Muscle
3. Nodule

Body Patterns

An additional way to annotate the image display is with body patterns. Body patterns are a simple graphic of a portion of the anatomy that is frequently scanned. The body pattern and probe marker can serve as a reference for a patient and probe positioning when images are archived or scanned.

To activate body patterns, press the **Body Pattern/Ellipse** control. Its placement on the screen can vary with the format of the display; for example, in Dual B-Mode the body pattern display area is different than in B-Mode.

A probe mark is associated with the body patterns and illustrates the probe position on the body pattern. This marker can be placed with the **Trackball** and rotated with the **Body Pattern/ Ellipse** control.

Depending on the exam category, the body pattern menu displays on the screen. Select the respective numeric key to display the corresponding Body Pattern on the right side of the image.

Abdomen/Cardiology/Urology/Small Parts Body Patterns

Figure 6-19. Abdomen/Cardiology/Urology/Small Parts Body Pattern Menu

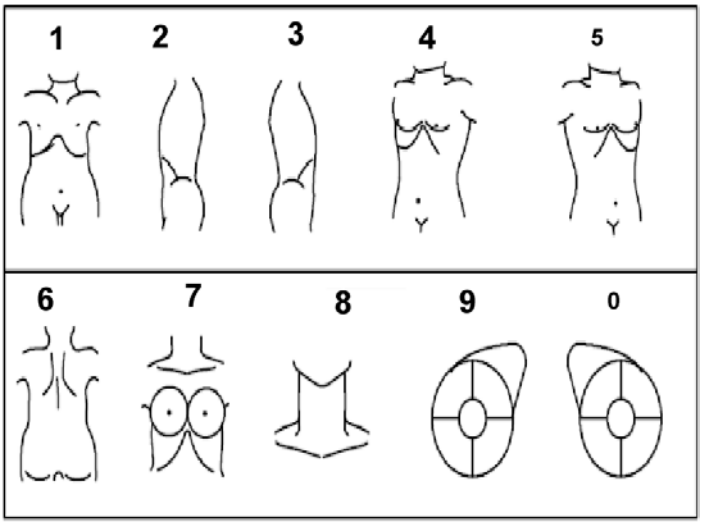


Figure 6-20. Abdomen/Cardiology/Urology/Small Parts Body Pattern Package

1. SUP: Supine
2. LGT: Left Side
3. RGT: Right Side
4. LOB: Left Oblique
5. ROB: Right Oblique
6. PRN: Prone
7. BRS: Breast
8. NEC: Neck
9. LMA: Left Mammo
10. RMA: Right Mammo

OB/GYN Body Patterns

Figure 6-21. Obstetrics/Gynecology Body Pattern Top Menu

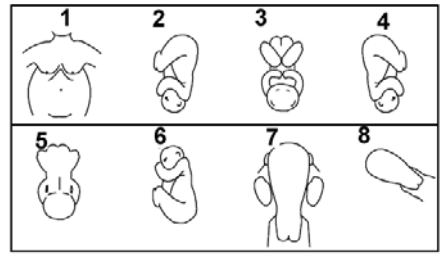


Figure 6-22. Obstetrics/Gynecology Package

1. MAMA: OB Patient
2. FTS1: Fetus1
3. FTS2: Fetus 2
4. FTS3: Fetus 3
5. FTS4: Fetus 4
6. FTS5: Fetus 5
7. UTRS1: Uterus1
8. UTRS2: Uterus2

Veterinary Body Patterns

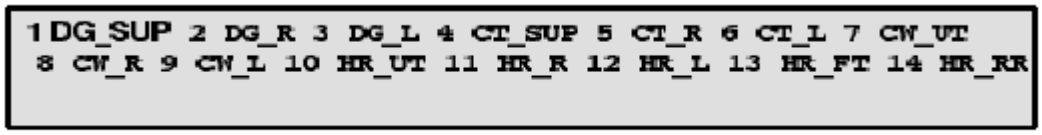


Figure 6-23. Veterinary Body Pattern Menu

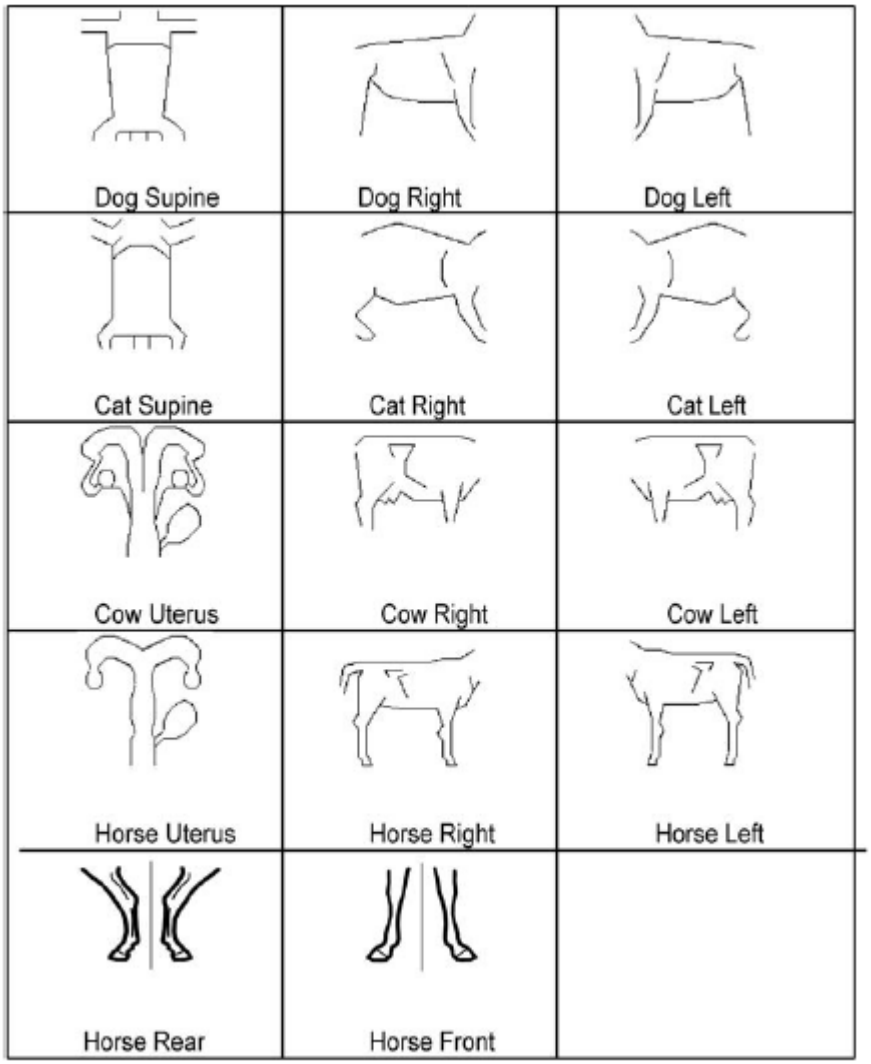


Figure 6-24. Veterinary Package

Veterinary Body Patterns (continued)

1. DG_SUP: Dog supine
2. DG_R: Dog Right
3. DG_L: Dog Left
4. CT_SUP: Cat supine
5. CT_R:Cat Right
6. CT_L: Cat Left
7. CW_UT: Cow Uterus
8. CW_R:Cow Right
9. CW_L: Cow Left
10. HR_UT: Horse Uterus
11. HR_R: Horse Right
12. HR_L: Horse Left
13. HR_RR: Horse Rear
14. HR_FT: Horse Front

NOTE: Vet application is not supported in this product.

Image Archive

Introduction

The Image Archiving function can be used to store images for future reference. The Stored images will be retained even when the system is powered off.

The System can store up to 112 images.

Operations such as image store, recall and erase can be initiated using direct keys from the Archive menu screen.

In addition to the scan image, the system will also store patient data, measurements(and the report pages) and the other system scan data. These can be retrieved while recalling the image.

To exit Image Archive ,Press Clear .The patient information prior is restored.

To Store Images

Follow the below instructions to store patient images on to the system:

- Scan the image. Press the “Freeze” key.
- Press “Store” key.
- Enter Comments in the Field and press enter.
- Press “Store” key again, to store the image.

To Recall/Erase Images

On pressing “Recall” key, the image archive screen appears on the screen.

To exit Image Archive, press Freeze. The Patient information prior to recalling is restored.

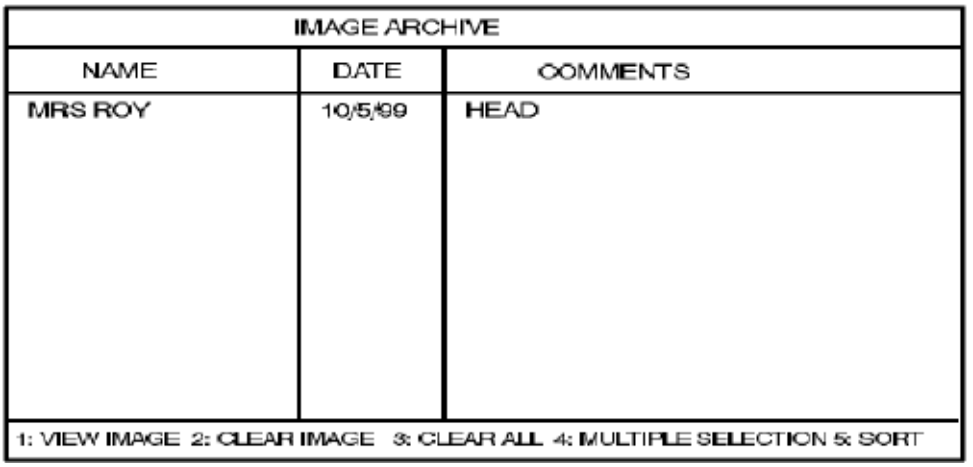


Figure 6-25. Image Archive Screen

Select the required Image from the Image Archive Screen.

Reviewing the images

Press “1” to view the image from image archive screen.

Clearing the images

Move the Trackball to select images:

- On pressing “2” from image archive screen:

  Clear images?1:Yes 2:No appears on the screen. On selecting “1”, the selected patient information clears from the image archive. On selecting “2”, the system quits clearing the images from archive screen.
- On pressing “3” from image archive screen, clears all the images from the image archive screen.

Multiple Selection

On selecting “4” from image archive screen the enables following selections:

Figure 6-26. Multiple Selection Menu

- On selecting “1”, the system allows you to select one image data.
- On selecting “2”, the system allows you to select all images data.
- On selecting “3”, the system allows you to transfer the selected images to USB Flash Drive.
- On selecting “4”, the selections get cleared.
- On selecting “5”, the system exits from multiple selection menu.

USB Transfer

The Image Transfer is used to store and view images from the LOGIQ 100 PRO on PC by using USB Flash drive.

The images can be stored as a JPEG file and given to the patients on a USB Flash drive.

NOTE: To view images on a PC, the PC should support USB port with Windows Operating system.

USB Transfer option enables you to transfer the selected images to external USB Flash Drive.

- Select the image to be transfer by multiple selection menu.

  On pressing “3” from multiple selection menu, the selected image transfer to the USB Flash drive.
- On pressing “2” from multiple selection menu, all the images get selected.

  On pressing “3” from multiple selection menu, all the images transfer to the USB Flash drive.

NOTE: Please be ensure that USB Flash drive to be connected before attempting to transfer images to USB Flash drive. If USB stick is not connected to the L100 PRO system, the system will prompt "USB Flash Drive is not connected".

VCR & Printer Operations

VCR Operations

An optional video cassette recorder is provided for the LOGIQ 100 PRO.

Press the EXTERNAL VIDEO key to enable an external video (i.e. VCR Playback) to be viewed on the LOGIQ 100 PRO system monitor.

Printer Operations

VGP Operations

Press the RECORD key to record the image which is on the display monitor and to print on a video graphic printer automatically.

USB Printer Operations

The Images and Report Pages of the LOGIQ 100 PRO can be printed on HP Laser Jet printer through the USB port on the Rear Panel of the LOGIQ 100 PRO.

- Scan and obtain the image to print (or) Press “CONTROL R” to display report.
- Press SHIFT + RECORD.

  The first image or report is transferred to the printer. The Printout Status “I5” appears denoting 5 images are still pending. The Receive LED on the printer flashes to indicate data transfer is in process.

  Obtain the next image to be printed and repeat the above steps. Once six images are transferred to the printer it automatically starts the print operation.

Supported Print Formats

The following image print formats available for LOGIQ 100 PRO:

- To Print 2 Images:

  Press SHIFT + RECORD to send the 1st image to print and then Press SHIFT + RECORD once again to send the 2nd image to the printer. Press CTRL J to eject the page (to print only 2 images).

- To Print 4 Images:

  Press SHIFT + RECORD for four images. Press CTRL J to eject the page (to print only 2 images).

- To Print 6 Images:

  Press SHIFT + RECORD for six images.Once 6 images are sent the printer, it automatically starts printing the images.

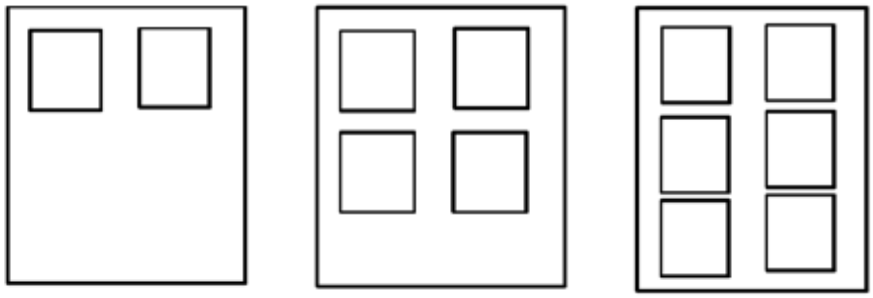


Figure 6-27. Image Print Formats

Supported Print Formats (continued)

- To Print 2 Images and one report:

  Press SHIFT + RECORD to send the 1st image to print and then Press SHIFT + RECORD once again to send the 2nd image to the printer.

  Press SHIFT + RECORD while report is on display.

  Press CTRL J to eject the page (to print only 2 images).

- To Print 1 report:

  Press SHIFT + RECORD while report is on display. Press CTRL J to eject the page (to print only 2 images).

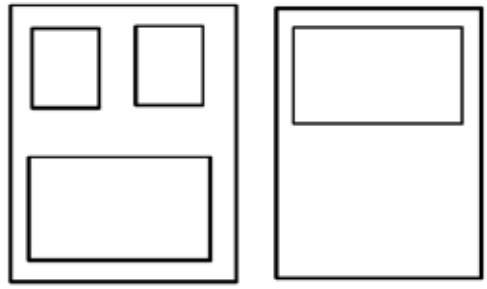


Figure 6-28. Image/Report Print Formats

Chapter 7

General Measurements and Calculations

Describes how to perform general measurements and calculations.

Introduction

Overview

Measurements and calculations derived from ultrasound images are intended to supplement other clinical procedures available to the attending physician. The accuracy of measurements are not only determined by system accuracy, but also by the use of proper medical protocols by the user. When appropriate, be sure to note any protocols associated with a particular measurement or calculation. Formulas and databases used within the system software that are associated with specific investigations are noted. Please refer to the original article describing the investigators recommended clinical procedures.

Basic Measurements are made after the image is captured and frozen.

General Instructions

You can take measurements in all modes and image formats, including real-time or frozen. Prior to making measurements, Press Freeze to stop image acquisition. Trace measurements can only be made in the B-Mode area. Ellipse measurements can only be made in the B-Mode area in the frozen state.

Up to 4 measurement values are updated on the display at one time. Record all desired measurements displayed on the screen before erasing them.

Cursors

While you are making a measurement, the measurement caliper is either active (open plus sign) or fixed (closed plus sign).

Once the measurement sequence is complete, the cursor symbol changes to one of the following.

Figure 7-1. Fixed Caliper Symbols

Selecting a calculation

When you take measurements, you can select the calculation before you take the measurement or after you take it. For example, in Obstetrics, if you select the calculation before you take the measurement, the estimated fetal age is displayed as you take the measurement. If you select the calculation after you take the measurement, the estimated fetal age is displayed after you complete the measurement.

NOTE: After you take a measurement, if you select a calculation and the measurement is not applicable for the calculation, then the system assumes you want to start the calculation. The system then uses the calculation for the next measurement.

Erasing Measurements

The following actions erase measurements from the system's memory:

HINTS

- If the measurement has not been completed, pressing **Clear** once clears the current measurement and the open ended cursor appears on the screen. Pressing **Clear** a second time clears the open ended cursor. Pressing **Clear** a third time clears all measurements on the screen and exits out of the Measurement menu.
- If the measurement is complete, pressing **Clear** once clears all data from the display and exits out of the Measurement menu.
- If you make a new measurement that exceeds the maximum number of allowable measurements, the system erases the first (oldest) measurement and adds the new measurement.
- If you press New **Patient** , the system erases all measurements and calculations on the display.

Mode Measurements

B-Mode Measurements

Two basic measurements can be made in B-Mode.

- Distance
- Circumference and Area
  - Ellipse Method
  - Trace Method

Distance Measurement

One Distance Measurement

Distance Measurements are made in the B-Mode portion of the image.

To make a distance measurement:

1. Press **Freeze** to stop image acquisition

NOTE: *Freezing the image is not mandatory when performing a distance measurement.*

2. Press **Measure** once; an active caliper displays.
3. To position the active caliper at the start point, move the **Trackball**.
4. To fix the start point, press **Set**.

   The system fixes the first caliper and displays a second active caliper.

   Distance in mm or cm appears on the right side of the screen.
5. To position the second active caliper at the end point, move the **Trackball**.
6. To complete the measurement, press **Set**.

   The system displays the distance value in “mm” on the Measurement Summary window.

Press Measure key to toggle between which cursor to be active.

HINTS

- **Before** you complete a measurement:
  - To toggle between active calipers, press **Measure**.
  - To erase the second caliper and the current data measured and start the measurement again, press **Clear** once.

Distance Measurement (continued)

Two Distance Measurement

To perform a two distance measurement, perform a distance measurement as described in ‘One Distance Measurement’ on *page 7-6*.

When you have completed a one distance measurement, an open ended cursor appears on the screen. Repeat steps 3 through 6 from the ‘One Distance Measurement’ on *page 7-6*.

The system displays the two distance values (d1,d2) on the Measurement Summary window.

Three Distance Measurement

To perform a three distance measurement, perform a distance measurement as described in ‘One Distance Measurement’ on *page 7-6*.

When you have completed a one distance measurement, an open ended cursor appears on the screen. Repeat steps 3 through 6 from the ‘One Distance Measurement’ on *page 7-6*.

The system displays the two distance values (d1,d2) on the Measurement Summary window.

When you have completed two distance measurements, an open ended cursor appears on the screen. Repeat steps 3 through 6 from the ‘One Distance Measurement’ on *page 7-6*.

The system displays the three distance measurements (d1, d2, and d3) on the Measurement Summary window.

Circumference and area (Ellipse) Measurement

You can use an ellipse to measure circumference and area. To measure with an ellipse:

1. Press **Freeze** to stop image acquisition.
2. Press **Measure** once; an active caliper displays.
3. To position the active caliper, move the **Trackball**.
4. To fix the start point, press **Set**. The system fixes the first caliper and displays a second active caliper.

   Distance in mm appears on the right side of the screen.
5. To position the second caliper, move the **Trackball** to the measurement end point.
6. Rotate the **Ellipse** control, an ellipse having an initial circle shape appears.
7. To position the ellipse and to size the measured axes (move the calipers), move the **Trackball**.
8. Rotate the **Ellipse** control to adjust the minor axis.
9. To toggle between active calipers, press **Measure**.
10. To complete the measurement, press **Set**. The system displays the area value in the Measurement Summary window.

HINTS

Before you complete the ellipse measurement:

- To erase the ellipse and the current data measured, press **Clear** once. The original caliper is displayed to restart the measurement.
- To exit the measurement function without completing the measurement, press **Clear** a second time.

Circumference and area (trace) measurement

To trace the circumference of a portion of the anatomy and calculate its area:

1. Press **Freeze** to stop image acquisition

NOTE: Freezing the image is not mandatory when performing a trace measurement.

2. Press **Measure** twice to display a dot cursor on the screen.
3. To position the trace caliper at the start point, move the **Trackball**.
4. To fix the trace start point, press **Set**. The trace caliper changes to an active caliper.

   The display on the right side of the screen shows the circumference in mm and Area in cm^2.
5. To trace the measurement area, move the **Trackball** around the anatomy. A dotted line shows the traced area.

   The circumference displayed on the right of the screen will change with the tracing.
6. To complete the measurement, press **Set**.

NOTE: Even if the trace is incomplete, pressing SET a second time will cause a straight line to automatically join the start and end points of the trace.

   The system displays the circumference and the area in the Measurement Summary window.
7. If necessary, repeat measurements by following the same procedure.

HINTS

Before you complete the trace measurement:

- To erase the dotted line but not the trace caliper, press **Clear** once.
- To clear the trace caliper and the current data measured, press **Clear** twice.

M-Mode Measurements

Tissue Depth Measurement

Tissue depth measurement in M-Mode functions the same as distance measurement in B-Mode. It measures the vertical distance between calipers.

1. Press **Freeze** to stop image acquisition.
2. Press **Measure** once; a cursor with a vertical dotted line appears.
3. To position the active caliper at the most anterior point you want to measure, move the **Trackball**.
4. To fix the start point, press **Set**.

   The system fixes the first caliper and displays a second active caliper.
5. To position the second caliper at the most posterior point you want to measure, move the **Trackball**.
6. To complete the measurement, press **Set**.

   The system displays the vertical distance between the two points in the Measurement Summary window.

Time Interval Measurement

To measure a horizontal time interval:

1. Press **Freeze** to stop image acquisition.
2. Press **Measure** twice to measure the time interval between an event; an open ended caliper appears on the screen.

NOTE: If the appropriate measurement was already performed, the elapsed time is calculated and displayed.

3. To position the caliper at the start point, move the **Trackball**.
4. To fix the first caliper, press **Set**. The system fixes the first caliper and displays a second active caliper.
5. To position the second caliper at the end point, move the **Trackball**.
6. To complete the measurement, press **Set**. The system displays the time interval (in seconds) between the two calipers in the Measurement Summary window.

Generic Measurements

The general measurement menu is common to all diagnostic categories.

To invoke the general measurements menu, press the MEASUREMENT key in B, B/B, B/M or MModes. The general measurement menu appears at the bottom of the screen.

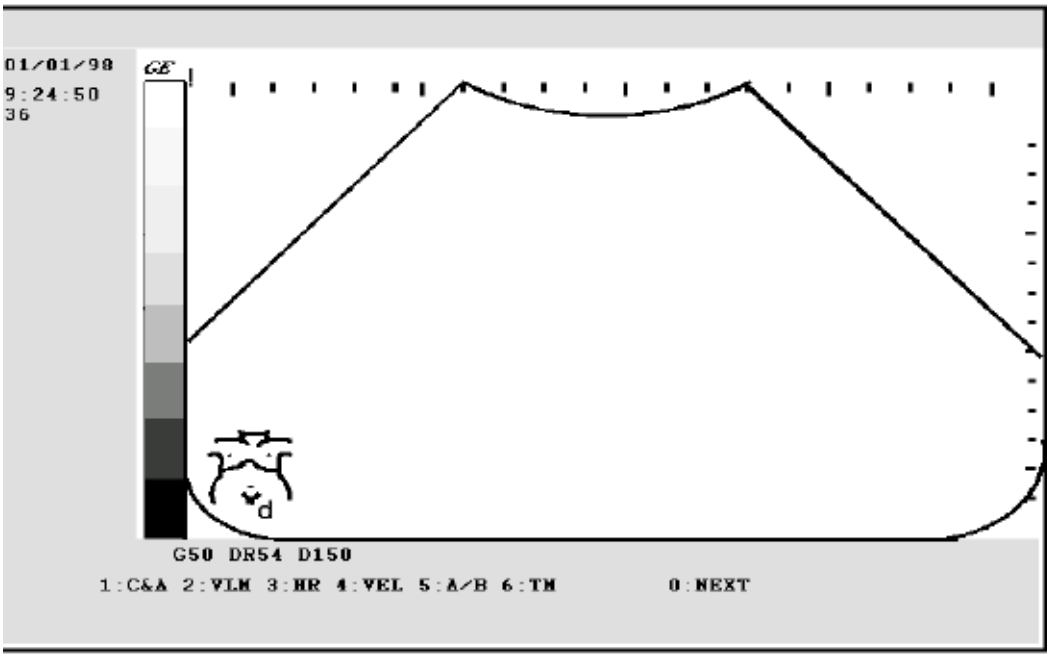


Figure 7-2. Generic Measurement Menu

To select an item, Press the appropriate NUMERIC key.

B-Mode Measurements

Area Measurement

Scan to obtain a section of the anatomical organ whose circumference/area is to be measured

1. Press **Freeze** to stop image acquisition.
2. Press **Measure** to display the Measurement Menu. Press the numeric key “0” to display the Generic Measurement Menu.
3. Press the appropriate numeric key to select Area in the Top Menu.

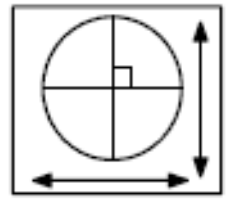


Figure 7-3. Area Measurement

Circumference and area can be measured by three methods:

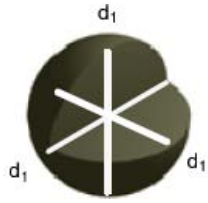
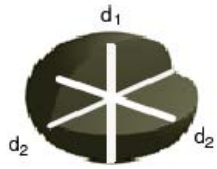
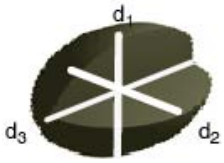
a. Two Distance
b. Ellipse Method
c. Trace Method

For the details of these measurement methods, See ‘B-Mode Measurements’ on *page 7-5 for more information.*

Volume Measurement

There are three geometric volume models available for the LOGIQ 100 PRO. The system automatically chooses the model based on the number of measurements provided.

Table 7-1: Supported Geometrical Models

Model	Input Measurements	Volume Calculation Examples	Formula
Spherical	• 1 Distance		$Vol = \frac{\Pi \times d^3}{6}$
Prolate Spheroid	• 2 Distance • 1 Ellipse		$Vol = \frac{\Pi \times d_1 \times d_2{}^2}{6}$
Spheroidal	• 3 Distance • 2 Distance and 1 Ellipse • 1 Distance and 1 Ellipse • 2 Ellipse		$Vol = \frac{\Pi \times d_1 \times d_2 \times d_3}{6}$

1. When an ellipse measures volume, the system takes the long and short axes of the ellipse to calculate volume.
2. When two ellipses measure volume, the system uses the long and short axes of the first ellipse and the first axis of the second ellipse to calculate volume. The second axis of the second ellipse is not used in the calculation as it is equal to one of the axes of the first ellipse.

NOTE: Proper understanding of this system behavior is necessary to prevent obtaining wrong results in calculation of volume using two ellipse measurements.

A/B Ratio

In B-Mode, you can calculate A/B ratio by diameter or by area.

For example, using A/B ratio you can calculate ratio between femur length (FL) and humerus length (HL) or FL and head circumference (HC) or HC and abdominal circumference (AC).

1. Take two one dimensional measurements whose A/B ratio needs to be calculated.
2. Select A/B Ratio from the Top Menu.

   A/B ratio is calculated and displayed in the Measurement Summary window.

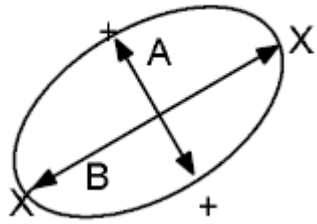


Figure 7-4. Ratio Calculation

NOTE: Both measurements must be made before selecting the A/B ratio. If the two measurements are not made before selecting A/B Ratio, an error message appears on the screen.

Biopsy Depth Measurement

To measure the desired depth for needle insertion during a biopsy:

1. Press CONTROL B ENTER or the alphanumeric key ‘B’ to turn the Biopsy Zone Display ON.
2. Press **Measure** once to invoke the biopsy depth; an active caliper displays on the image area.
3. To position the active caliper along the center line, move the **Trackball**.

   The biopsy depth values are computed and displayed on the Measurement Summary window.
4. To exit out of the measurement mode, press **Clear**.

M-Mode Measurements

Heart Rate

To calculate the heart rate from M-Mode:

1. Obtain an image and press Measure. Select ***HR*** from the Generic Measurement menu.

   The system displays an active caliper.

NOTE: *If the appropriate measurement was already performed the Heart Rate is calculated and displayed.*

2. To position the caliper at a recognizable point in the first cycle, move the **Trackball**.
3. To fix the first caliper, press **Set**.

   The system displays a second active caliper.
4. To position the caliper at the identical point in the next cycle, you need to move the **Trackball**.

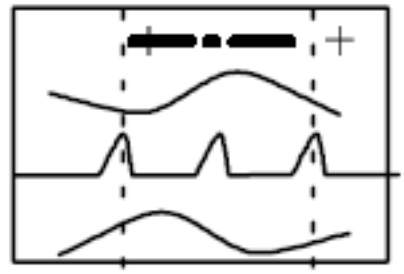


Figure 7-5. Heart Rate Measurement

5. To complete the measurement, press **Set**.

   The heart rate is displayed on the calculation result area of the screen in beats per minute.

Velocity Measurement

To calculate the Velocity from M-Mode:

- Obtain an image and press Measure. Select VEL from the Generic Measurement menu.

  The system displays an active caliper.

NOTE: *If the appropriate measurement was already performed the Velocity is calculated and displayed.*

- To position the caliper at a recognizable point in the first cycle, move the Trackball.
- To fix the first caliper, press Set.

  The system displays a second active caliper.
- Use the TRACKBALL to move the second open ended cursor to a point such that the dotted line is tangential to the steepest slope of the M-Mode trace of the structure of interest.
- To position the caliper at the identical point in the next cycle, you need to move the Trackball.

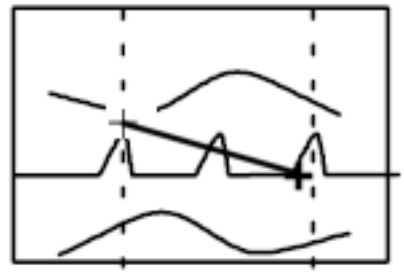


Figure 7-6. Velocity Measurement

- To complete the measurement, press Set.

  The Velocity is displayed on the calculation result area ofthe screen.

Chapter 8

Abdomen and Small Parts

Describes how to perform Abdomen and Small Partsmeasurements and calculations.

Abdomen/Small Parts Exam Preparation

Introduction

Measurements and calculations derived from ultrasound images are intended to supplement other clinical procedures available to the attending physician. The accuracy of measurements is not only determined by the system accuracy, but also by use of proper medical protocols by the user. When appropriate, be sure to note any protocols associated with a particular measurement or calculation. Formulas and databases used within the system software that are associated with specific investigators are so noted. Be sure to refer to the original article describing the investigator's recommended clinical procedures.

Calculation formulas are available in the Measurement Formulae chapter of advanced reference manual.

General Guidelines

New Patient information must be entered before beginning an exam. See ‘Beginning an Exam’ on *page 4-2 for more information.*

Any measurement can be repeated by selecting that measurement again from the Control Menu.

After pressing the Measure key, the measurement screen appears on the screen. Press the appropriate numeric key to perform the respective measurements. Press Numeric Key “0” to display the next available abdominal measurements.

Abdomen

B-Mode Measurements

The following measurements are available for the Abdomen exam category.

- Generic Measurement Menu
- Obstetrics Measurement Menu

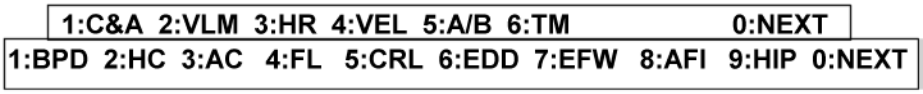


Figure 8-1. Abdomen Measurements

Obstetrics Measurements

Refer the obstetrics chapter for more information on doing obstetrics measurements.

Generic Measurements

On selecting NEXT (numeric “0” key) on the measurement menu displays generic measurements. Select the appropriate numeric key to perform the respective measurement.

C&A(Area) Measurement — See ‘Area Measurement’ on *page 7-13 for more information.*

VLM(Volume) Measurement — See ‘Volume Measurement’ on *page 7-14 for more information.*

A/B (Ratio) Measurement — See ‘A/B Ratio’ on *page 7-15 for more information.*

Heart Rate Measurement — See ‘Heart Rate’ on *page 7-17 for more information.*

Veocity Measurement — See ‘Velocity Measurement’ on *page 7-18 for more information.*

Time Measurement — See ‘Time Interval Measurement’ on *page 7-11 for more information.*

Radiology/Abdominal Report Page

Overview

Pressing “Ctrl R” or R displays the obstetrics report page while in the abdomen exam category.The performed abdominal measurements are automatically transferred to the report pages.The patient details, entered during new patient registration, get transferred to the report pages. The Report page provides a data entry to enter comments regarding the patient diagnostics. Refer “OB Report Pages” for more information.

Recording Summary Reports

Press the Record key to print the report page on the video graphic printer when the report page is displayed on the screen.

LOGIQ 100 PRO does not provide report archive.

Ensure that the measurement report has been recorded prior to creating a new patient.

Small Parts

B-Mode Measurements

The following measurements available for small parts exam category.

- Generic Measurement Menu
- Obstetrics Measurement Menu

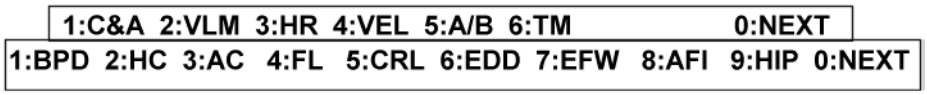


Figure 8-2. Small Parts Measurements

Obstetrics Measurements

Refer the obstetrics chapter for more information on doing obstetrics measurements.

Generic Measurements

On selecting NEXT (numeric “0” key) on the measurement menu displays generic measurements. Select the appropriate numeric key to perform the respective measurement.

C&A(Area) Measurement — See ‘Area Measurement’ on *page 7-13 for more information.*

VLM(Volume) Measurement — See ‘Volume Measurement’ on *page 7-14 for more information.*

A/B (Ratio) Measurement — See ‘A/B Ratio’ on *page 7-15 for more information.*

Heart Rate Measurement — See ‘Heart Rate’ on *page 7-17 for more information.*

Veocity Measurement — See ‘Velocity Measurement’ on *page 7-18 for more information.*

Time Measurement — See ‘Time Interval Measurement’ on *page 7-11 for more information.*

Small Parts Report Page

Overview

Pressing “Ctrl R” or R displays the obstetrics report page while in the small parts exam category.The performed abdominal measurements are automatically transferred to the report pages.The patient details, entered during new patient registration, get transferred to the report pages. The Report page provides a data entry to enter comments regarding the patient diagnostics. Refer “OB Report Pages” for more information.

Recording Summary Reports

Press the Record key to print the report page on the video graphic printer when the report page is displayed on the screen.

LOGIQ 100 PRO does not provide report archive.

Ensure that the measurement report has been recorded prior to creating a new patient.

Chapter 9

Obstetrics

Describes how to perform obstetric measurements and calculations, and how to use OB graphs and reports.

OB Generic Information

Exam Preparation

Prior to an ultrasound examination, the patient should be informed of the clinical indication, specific benefits, potential risks, and alternatives, if any. In addition, if the patient requests information about the exposure time and intensity, it should be provided. Patient access to educational materials regarding ultrasound is strongly encouraged to supplement the information communicated directly to the patient. Furthermore, these examinations should be conducted in a manner and take place in a setting which assures patient dignity and privacy.

- Prior material knowledge and approval of the presence of nonessential personnel with the number of such personnel kept to a minimum.
- An intent to share with the parents per the physician’s judgement, either during the examination or shortly thereafter, the information derived.

Ultrasound examinations performed solely to satisfy the family's desire to know the fetal sex, to view the fetus, or to obtain a picture of the fetus should be discouraged.

To Start an Obstetrics Exam

New Patient information must be entered before beginning an exam. See ‘Beginning an Exam’ on *page 4-2 for more information.*

- Scan to obtain a section of the anatomical organ whose abdominal measurements to be perform. See ‘Scanning a New Patient’ on *page 4-5 for more information.*.
- Press **Freeze** to unfreeze the image.
- Press the **Measurement** key.

  The Obstetrics measurement screen appears on the screen. Press the appropriate numeric key to perform the respective measurements. Pressing numeric key “0” displays the next available obstetrics/generic measurements.

Any measurement can be repeated by selecting that measurement again from the control menu.

OB Measurements and Calculations

Introduction

Measurements and calculations derived from ultrasound images are intended to supplement other clinical procedures available to the attending physician. The accuracy of measurements is not only determined by the system accuracy, but also by use of proper medical protocols by the user. When appropriate, be sure to note any protocols associated with a particular measurement or calculation. Formulas and databases used within the system software that are associated with specific investigators are so noted. Be sure to refer to the original article describing the investigator's recommended clinical procedures.

When you make measurements, you can select the calculation before you make the measurement or after you make it. If you select the calculation before you make the measurement, the Results Window shows the estimated fetal age as you make the measurement. If you select the calculation after you make the measurement, the estimated fetal age is displayed after you complete the measurement. The measurements steps in this section tell you to select the calculation before you make the measurement.

The following pages describe how to make OB measurements and calculations. The measurements are organized by mode, and within mode are listed in alphabetical order.

Out of Range – If the system indicates that a measurement is out of range (OOR), it means the following:

- The measurement is outside of the range for the data used in the calculation. That means that the measurement is either less than or more than the range of measurements used to determine fetal age based on the measurement.

OB Measurements Author Selection

Before performing OB measurements, the author for the respective OB measurement should be required. It is recommended that, prior to performing obstetrics measurements, the author should be configurable through “Measurements configuration setup”. See ‘Europe OB Table Author Presets’ on *page 13-6 for more information.*

OB Measurement Packages

There are five Obstetrics measurement packages and five user programmable obstetrics tables are available on the LOGIQ 100 PRO which enable calculations of the Gestational Age of the fetus. To select the measurement version, See ‘System Presets Menu’ on *page 13-3 for more information.*.

OB Specific Measurements-US/ASUM Versions

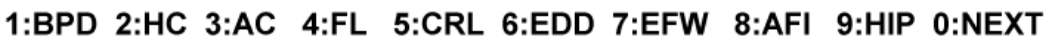


Figure 9-1. US/ASUM Version Measurements Menu

The OB versions consist of the following measurements:

- BPD (Biparietal Diameter)

  See ‘Biparietal Diameter (BPD)’ on *page 9-15 for more information.*
- AC (Abdominal Circumference)

  See ‘Abdominal Circumference (AC)’ on *page 9-10 for more information.*
- HC (Head Circumference)

  See ‘Head Circumference (HC)’ on *page 9-21 for more information.*
- FL (Femur Length)

  See ‘Femur Length (FL)’ on *page 9-17 for more information.*
- CRL (Crown Rump Length)

  See ‘Crown Rump Length (CRL)’ on *page 9-16 for more information.*
- AFI (Amniotic Fluid Index)

  See ‘Amniotic Fluid Index (AFI)’ on *page 9-11 for more information.*
- EDD (Estimated Date of Delivary)

  See ‘Estimated Date of Confinement (EDC/EDD)’ on *page 9-24 for more information.*
- EFW (Estimated Fetal Weight)
- HIP Measurement

  See ‘HIP Dysplasia Measurement (HIP)’ on *page 9-25 for more information.*

OB Specific Measurements—Tokyo University Version

Figure 9-2. Tokyo University Version Measurement Menu

The Tokyo version consists of the following measurements:

- GS (Gestational Sac)

  See ‘Gestational Sac (GS)’ on *page 9-20 for more information.*
- BPD (Biparietal Diameter)

  See ‘Biparietal Diameter (BPD)’ on *page 9-15 for more information.*
- CRL (Crown Rump Length)

  See ‘Crown Rump Length (CRL)’ on *page 9-16 for more information.*
- FL (Femur Length)

  See ‘Femur Length (FL)’ on *page 9-17 for more information.*
- LV (Length Of Vertebra)

  See ‘Length of Vertebra (LV)’ on *page 9-23 for more information.*.
- APTD&TTD (Anteroposterior Trunk Diameter & Transverse Trunk Diameter)

  See ‘Anteroposterior Trunk Diameter & Transverse Trunk Diameter (APTD & TTD)’ on *page 9-13 for more information.*
- EDC (Estimated Date of Confinement)

  See ‘Estimated Date of Confinement (EDC/EDD)’ on *page 9-24 for more information.*
- EFBW (Estimated Fetal Body Weight)

OB Specific Measurements—Osaka University Version

Figure 9-3. Osaka University Version Measurement Menu

The Osaka version consists of the following measurements:

- CRL (Crown Rump Length)

  See ‘Crown Rump Length (CRL)’ on *page 9-16 for more information.*
- BPD (Biparietal Diameter)

  See ‘Biparietal Diameter (BPD)’ on *page 9-15 for more information.*
- FTA (Fetal Trunk Cross sectional Area)

  See ‘Fetal Trunk Cross Sectional Area (FTA)’ on *page 9-18 for more information.*
- HL (Humerus Bone Length)

  See ‘Humerus Bone Length (HL)’ on *page 9-22 for more information.*
- FL (Femur Length)

  See ‘Femur Length (FL)’ on *page 9-17 for more information.*
- GS (Gestational Sac)

  See ‘Gestational Sac (GS)’ on *page 9-20 for more information.*
- EDC (Estimated Date of Confinement)

  See ‘Estimated Date of Confinement (EDC/EDD)’ on *page 9-24 for more information.*
- EFBW (Estimated Fetal Body Weight)

OB Specific Measurements—European Version

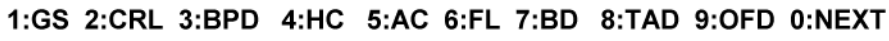


Figure 9-4. European Version Measurement Menu

- GS (Gestational Sac)

  See ‘Gestational Sac (GS)’ on *page 9-20 for more information.*
- CRL (Crown Rump Length)

  See ‘Crown Rump Length (CRL)’ on *page 9-16 for more information.*
- BPD (Biparietal Diameter)

  See ‘Biparietal Diameter (BPD)’ on *page 9-15 for more information.*
- HC (Head Circumference)

  See ‘Head Circumference (HC)’ on *page 9-21 for more information.*
- AC (Abdominal Circumference)

  See ‘Abdominal Circumference (AC)’ on *page 9-10 for more information.*
- FL (Femur Length)

  See ‘Femur Length (FL)’ on *page 9-17 for more information.*
- BD (Binocular Distance)

  See ‘Binocular Distance (BD)’ on *page 9-14 for more information.*
- TAD (Transverse Abdominal Diameter)

  See ‘Transverse Abdominal Diameter (TAD)’ on *page 9-24 for more information.*
- OFD (Occipito Frontal Diameter)

  See ‘Occipito Frontal Diameter (OFD)’ on *page 9-24 for more information.*
- FT (Foot Distance)

  See ‘Foot Distance (Ft)’ on *page 9-19 for more information.*
- HIP Measurement

  See ‘HIP Dysplasia Measurement (HIP)’ on *page 9-25 for more information.*

OB Measurements

Follow the below process to calculate OB version specific measurements. For OB measurement formulas, see the Measurement Formulas chapter.

Abdominal Circumference (AC)

Two measurement procedures (pre-selection and post-selection) help to achieve flexibility in making AC measurements.

The AC measurement can be calculated by using a Two Distance, Ellipse or Trace Method.

The method of measurement can be set through “Configuration setup”. See ‘System Presets Menu’ on *page 13-3 for more information.* for more information.

For details on performing these measurements, See ‘B-Mode Measurements’ on *page 7-13 for more information.*

Pre Selection Select the appropriate numeric key in the OB measurement menu and then perform the measurement.

The Gestational Age is calculated and displayed in the measurement summary window.

Post Selection First perform the measurement and then assign the completed measurement to AC. The Gestational Age will be displayed on the Measurement Summary window.

Amniotic Fluid Index (AFI)

To calculate the amniotic fluid index, you make measurements of the four quadrants of the uterine cavity. The system adds these four measurements together to calculate the Amniotic Fluid Index.

Select the appropriate numeric key in the OB measurement menu.

Perform 4 Distance Measurements in the proper scan planes to arrive at the Amniotic Fluid Index calculation. The AFI, along with the distances, display in the Measurement Summary window of the display.

If any distance measurements are available before invoking the Amniotic Fluid Index, only the remaining distance measurements need to be made to arrive at AFI. Unfreezing the image after doing one AFI measurement does not erase the results in the Measurement Summary Window. You can continue on with the remaining calculations to arrive at the AFI value.

Amniotic Fluid Index (AFI) (continued)

The normal values are considered to be:

36-40 weeks:

0-5 cm = very low

5.1-8.0cm = low

8.1 - 18.0 cm = normal

>18.0 = high

Dr. Rutherford/Dr. Phelan, Obstetrics and Gynecology, Volume 70, No. 3, Part 1, p. 353-6, Sept. 1987.28-40 weeks:

15.0 cm = average

>20.0 - 24.0 = hydramnios

<5.0-6.0 = Oligohydramnios

Dr. C.C. Smith, The Female Patient, Volume 15, p. 85-97, March 1990.

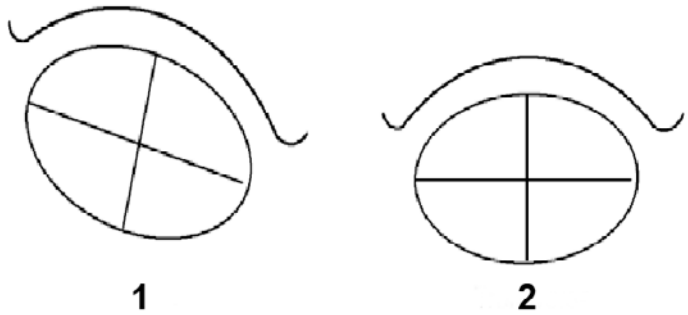


Figure 9-5. AFI Measurement Planes

1. Sagittal
2. Transverse

Anteroposterior Trunk Diameter & Transverse Trunk Diameter (APTD & TTD)

APTD and TTD are distance measurements which are required for calculation of the Estimated Fetal Body Weight in the Tokyo University Version.

- Select the appropriate numeric key in the Measurement Menu.
- Perform two one distance measurements. The first distance measurement is assigned to calculate APTD, the second distance is assigned to calculate TTD.

  The Measurement summary window displays APTD, and TTD. See ‘One Distance Measurement’ on *page 7-6* for more information on how to perform one distance measurements.

Figure 9-6. APTD&TTD Measurement

Binocular Distance (BD)

Binocular Distance is the measurement taken between the two sockets of the fetal eyes to estimate the fetal age.

- Select the appropriate numeric key in the Measurement Menu.

  If the relevant Distance Measurement is already available, the Gestational Age is calculated and displays in the Measurement Summary Window of the display.
- Perform one distance measurement. The distance measured is assigned to calculate Binocular Distance.

  The Measurement summary window displays BD along with GA calculated. See ‘One Distance Measurement’ on *page 7-6* for more information on how to perform one distance measurements.

Figure 9-7. Binocular Distance Measurement

Biparietal Diameter (BPD)

Biparietal Diameter is the measurement taken between two parietal eminence of the fetal head to estimate the fetal age.

- Select the appropriate numeric key in the Measurement Menu.

  If the relevant Distance Measurement is already available, The Gestational Age is calculated and appears in the Measurement Summary Window of the display.
- Perform one distance measurement. The distance measured is assigned to calculate Biparietal Diameter.

  The Measurement summary window displays BPD along with GA calculated. See ‘One Distance Measurement’ on *page 7-6* for more information on how to perform one distance measurements.

Figure 9-8. Biparietal Diameter Measurement

Crown Rump Length (CRL)

Crown Rump Length measures the distance from the head to the rump (gluteal region) of the fetal body to estimate the fetal age.

- Select the appropriate numeric key in the Measurement Menu.

  If the relevant Distance Measurement is already available, The Gestational Age is calculated and appears in the Measurement Summary Window of the display.
- Perform one distance measurement.The distance measured is assigned to calculate Crown Rump Length, The Measurement summary window displays CRL along with GA calculated. See ‘One Distance Measurement’ on *page 7-6* for more information on how to perform one distance measurements.

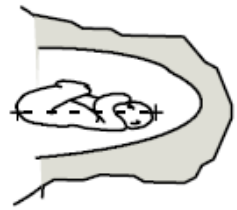


Figure 9-9. CRL Measurement

Femur Length (FL)

Femur Length is the measurement taken of the thigh bone from the greater trochanter to the condyle of the fetal body to estimate the fetal age.

- Select the appropriate numeric key in the Measurement Menu.

  If the relevant Distance Measurement is already available, The Gestational Age is calculated and appears in the Measurement Summary Window of the display.
- Perform one distance measurement. The distance measured is assigned to calculate Femur Length.

  The Measurement summary window displays FL along with GA calculated. See ‘One Distance Measurement’ on *page 7-6* for more information on how to perform one distance measurements.

Figure 9-10. FL Measurement

Fetal Trunk Cross Sectional Area (FTA)

Fetal Age Estimation is arrived at by measuring the cross-sectional area of the fetal trunk. Two measurement procedures (pre-selection and post-selection) help achieve flexibility in making FTA measurements.

Figure 9-11. FTA Measurement

The FTA measurement can be arrived at by using Two Distance, Ellipse or Trace Method.

The method of measurement can be set through “Configuration setup”. See ‘System Presets Menu’ on *page 13-3 for more information.* for more information.

For details on performing these measurements, See ‘B-Mode Measurements’ on *page 7-13 for more information.*

Pre Selection: Select the appropriate numeric key in the OB measurement menu and then perform the measurement.

The Gestational Age is calculated and displayed in the measurement summary window.

Post Selection First perform the measurement and then assign the completed measurement to FTA. The Gestational Age will be displayed on the Measurement Summary window.

Foot Distance (Ft)

Figure 9-12. Ft Measurement

Foot Distance is the measurement taken from the heel to the toe of the fetus to estimate the fetal age.

- Select the appropriate numeric key in the Measurement Menu.

  If the relevant Distance Measurement is already available, The Gestational Age is calculated and appears in the Measurement Summary Window of the display.
- Perform one distance measurement. The distance measured is assigned to calculate Foot Distance.

  The Measurement summary window displays FT along with GA calculated. See ‘One Distance Measurement’ on *page 7-6* for more information on how to perform one distance measurements.

Gestational Sac (GS)

Figure 9-13. GS Measurement

Gestational Sac is the measurement taken of the Sac of the fetus.

- Select the appropriate numeric key in the OB Measurement Menu.

  If the relevant Distance Measurement is already available, The Gestational Age is calculated and appears in the Measurement Summary Window of the display.
- Perform one distance measurement.The distance measured is assigned to calculate GS, The Measurement summary window displays GS along with GA calculated. See ‘One Distance Measurement’ on *page 7-6* for more information on how to perform one distance measurements.

NOTE: In the US OB version, you need three distance measurements to calculate the GS measurement.

Head Circumference (HC)

Two measurement procedures (pre-selection and post-selection) help achieve flexibility in making HC measurements.

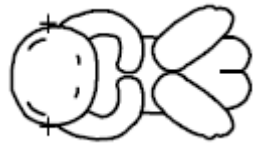


Figure 9-14. HC Measurement

The HC measurement can be arrived at by using a Two Distance, Ellipse or Trace Method.

The method of measurement can be set through “Configuration setup”. See ‘System Presets Menu’ on *page 13-3 for more information.* for more information.

For details on performing these measurements, See ‘B-Mode Measurements’ on *page 7-13 for more information.*

Pre Selection Select the appropriate numeric key in the OB measurement menu and then perform the measurement.

The Gestational age is calculated and displayed on the measurement summary window of the screen.

Post selection First perform the measurement and then assign the completed measurement to HC. The Gestational Age will be displayed on the Measurement Summary window.

Humerus Bone Length (HL)

Figure 9-15. HL Measurement

The measurement of the Humerus Bone Length (the shoulder bone) is taken from the greater tubercule to the trochea to estimate the fetal age.

- Select the appropriate numeric key in the OB Measurement Menu.

  If the relevant Distance Measurement is already available, the Gestational Age is will be calculated and appears in the Measurement Summary Window of the display.
- Perform one distance measurement. The distance measured is assigned to calculate HL.

  The Measurement summary window displays HL along with GA calculated. See ‘One Distance Measurement’ on *page 7-6* for more information on how to perform one distance measurements.

Length of Vertebra (LV)

Figure 9-16. LV Measurement

Length of Vertebra is the length of the Vertebra measurement from the Cervical to the Coccyx of the fetal body to estimate the fetal age.

- Select the appropriate numeric key in the OB Measurement Menu.

  If the relevant Distance Measurement is already available, the Gestational Age is calculated and appears in the Measurement Summary Window of the display.
- Perform one distance measurement. The distance measured is assigned to calculate LV.

  The Measurement summary window displays LV along with GA calculated. See ‘One Distance Measurement’ on *page 7-6* for more information on how to perform one distance measurements.

Occipito Frontal Diameter (OFD)

OFD is the longest measurement taken from the head circumference or measured from the front to the back of the head of the fetus.

- Select the appropriate numeric key in the OB Measurement Menu.

  If the relevant Distance Measurement is already available, The Gestational Age is calculated and appears in the Measurement Summary Window of the display.
- Perform one distance measurement. The distance measured is assigned to calculate OFD.

  The Measurement summary window displays OFD along with GA calculated. See ‘One Distance Measurement’ on *page 7-6* for more information on how to perform one distance measurements.

Transverse Abdominal Diameter (TAD)

- Select appropriate numeric key in the Measurement Menu.

  If the relevant Distance Measurement is already available, The Gestational Age is calculated and appears in the Measurement Summary Window of the display.
- Perform one distance measurement.The distance measured is assigned to calculate TAD, The Measurement summary window displays TAD along with GA calculated. See ‘One Distance Measurement’ on *page 7-6* for more information on how to perform one distance measurements.

Estimated Date of Confinement (EDC/EDD)

Use this method to arrive at the Estimated Date of Confinement from Estimated Gestational Age(EGA).

- Select appropriate numeric key in the Measurement Menu.

  GA: __W__D appears on the screen.
- Enter the number of gestation weeks, and the number of days.
- Press SET.

The EDC/EDD appears in the Calculation Result Area of the Display.

HIP Dysplasia Measurement (HIP)

The HIP calculation assists in assessing the development of the infant hip. In this calculation, three straight lines are superimposed on the image and aligned with the anatomical features. The two angles are computed, displayed, and can be used by the physician in making a diagnosis.

The three lines are:

- The baseline connects the osseous acetabulum convexity to the point where the joint capsule and the perichondrium unite with the iliac bone.
- The inclination line connects the osseous convexity to labrum acetabulare.
- The Acetabulum roof line connects the lower edge of the osilium to the osseous convexity. for more information on how to perform one distance measurements.

The Alpha angle is the supplement of the angle between 1 and 3. It characterizes the osseous convexity. The Beta angle is the angle between lines 1 and 2. It characterizes the bone supplementing additional roofing by the cartilaginous convexity.

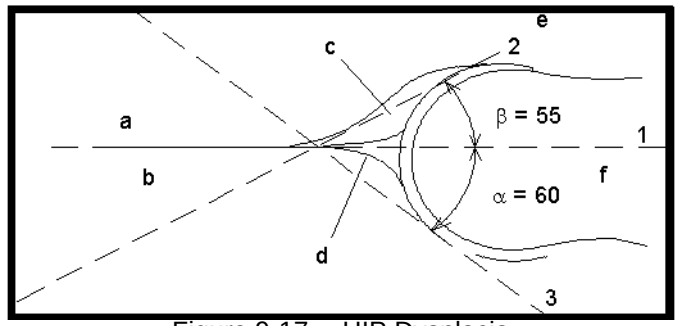


Figure 9-17. HIP Dysplacia

HIP Dysplasia Measurement (HIP) (continued)

a. Ilium
b. Iliac Bone
c. Labrum
d. Bony Roof
e. Cartilaginous acetabular roof
f. Femoral Head

To make a Hip Dysplasia measurement:

- From the Menu, select HIP. A horizontal dotted line displays.
- To place the baseline, move the Trackball. Position the crosshairs edge at the osseous convexity of the ilium.
- To rotate or change inclination, adjust the trackball control or Gain/Rotate.
- To fix the baseline, press Set.

  The system displays a second dotted line at an angle.
- To place the line along the inclination line of the osseous convexity to labrum acetabulare, move the Trackball.
- To rotate or change inclination, adjust the trackball control or Gain/Rotate.
- To fix the second line, press Set.

  The system displays a third dotted line at an angle.
- To place the caliper along the acetabular roof line, move the Trackball.
- To fix the third line, press Set.

  The system displays the hip measurements (alpha and beta) in the Results Window.

Measurement Hints

HINTS

If an OB measurement has not been completed, pressing **Clear** once clears the current measurement and the open ended cursor appears on the screen. Pressing **Clear** a second time clears the open ended cursor. Pressing **Clear** three times clears all measurements on the screen and exits out of the Measurement menu.

If an OB Measurement is complete, pressing **Clear** twice clears all data from the display and exits out of the Measurement menu. This does not clear data entered on to the report pages.

*NOTE: If the distance measurements do not relate to the OB Calculations to be calculated, erase all previous measurements by pressing **Clear** and start again.*

Calculation Error Messages

The calculation error messages and their explanation are given in table below

Table 9-1: Calculation Error Messages

Message	Expansion	Explanation
O.O.R	Out of Range	The calculation is out of range. The measured value is too large or too small.
N.M	No Measure	Calculations were attempted before allmeasurement steps are made.
ILG	Illegal	Wrong Mode Selected
ERR	Error	The denominator was zero

Obstetrics General Measurements

Press numeric key “0” to toggle between Obstetrics and Generic measurements.

Press the appropriate numeric key to perform the respective measurements displayed on the Measurement Menu.

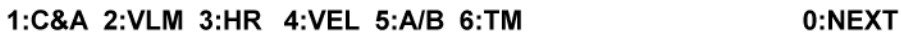


Figure 9-18. General OB Measurement Menu

Obstetrics General Measurements (continued)

C&A(Area) Measurement

See ‘Area Measurement’ on *page 7-13 for more information.*

VLM(Volume) Measurement

See ‘Volume Measurement’ on *page 7-14 for more information.*

A/B (Ratio) Measurement

See ‘A/B Ratio’ on *page 7-15 for more information.*

Heart Rate Measurement

See ‘Heart Rate’ on *page 7-17 for more information.*

Veocity Measurement

See ‘Velocity Measurement’ on *page 7-18 for more information.*

Time Measurement

See ‘Time Interval Measurement’ on *page 7-11 for more information.*

Obstetrics Report Pages

Overview

Accurate and complete report presentation starts at the beginning of the patient exam. This section explains how to display, edit, exit and print a hard copy of the Obstetrical Report Pages.

The following obstetric reporting pages are available for the LOGIQ 100 PRO:

- OB Reports (Obstetrics Report)

  The five versions (U.S., ASUM, Tokyo University, Osaka University, and European) are explained.
- Measurement Averaging Page (Obstetrics Detailed Report)
- Anatomical Survey Page (Obstetrics Summary Report)
- OB Trend Graph Page
- OB User Tables

Recording Summary Reports

Press the Record key to print the report page on the video graphic printer when the report page is displayed on the screen.

LOGIQ 100 PRO does not provide report archive.

Ensure that the measurement report has been recorded prior to creating a new patient.

OB Reports

Displaying and Exiting the Report Page

To activate the Report Page:

- Press “Control R” to display the exam category specific report page.

  The Report Page corresponding to the active OB version is displayed.

To deactivate the Report Page:

- Press “Control” or “Clear” key to exit the Report Page display and return to the normal ultrasound image display.

NOTE: Ensure that the diagnostic category selected is Obstetrics.

Edit Fields

The Report Page for the U.S., Australia, Tokyo University, Osaka University, and European versions contain edit fields.

Use alphanumeric keys to enter details. The Trackball can be used to move from one field to the next.

Use the Trackball to move the cursor and Edit the use fields as required.

USE Field Input Use field as any one of the following values: N, Y or D.

N Measurement not meant for use with the Average calculation.

Y Measurement meant for use with the Average calculation.

D Delete the measurement completely and use field for next measurement.

NOTE: The Delete use field will take affect when reinvoking the report page.

US Report Page Format

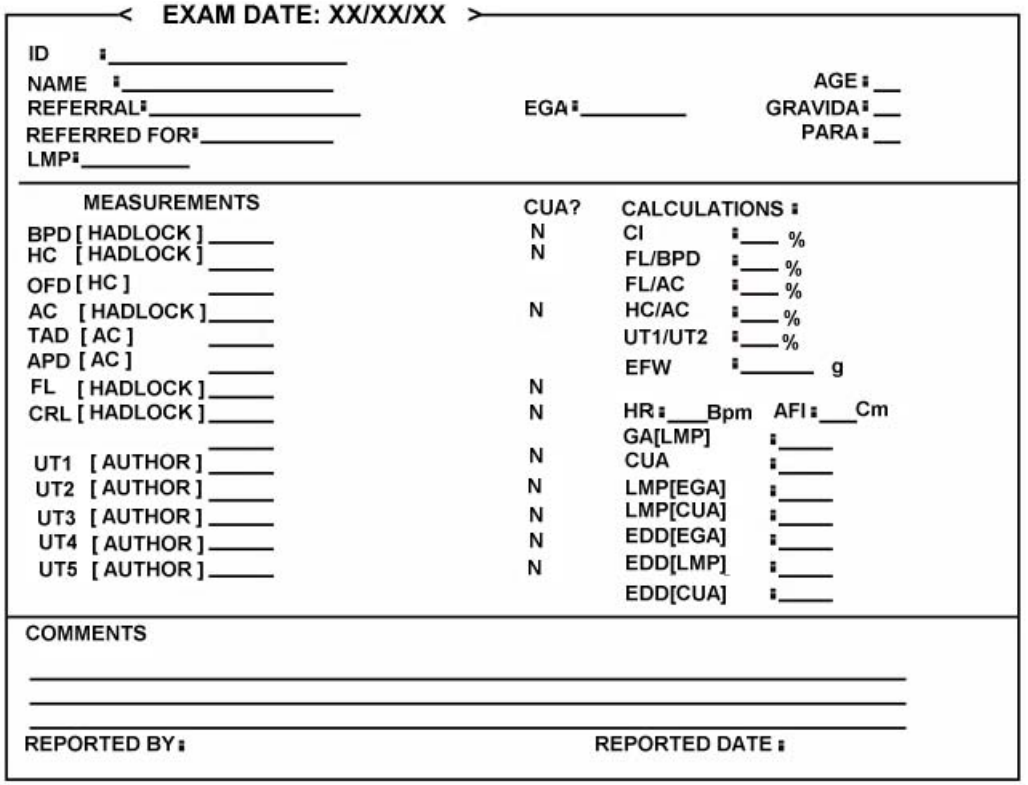


Figure 9-19. US Version Report Page

Patient Information

The ID, generated automatically during the registration of a new patient, is automatically transferred to the report page.

The Name, entered as part of patient registration, is automatically transferred to the report pages.

The patient Age, Enter patient age.

The referring physician, Enter the name of the referring physician (up to 16 characters).

A Referred For field is available on the report page for entering the reason for the referral (up to 30 characters).

OB Exam Information

LMP (Last Menstrual Period): The LMP, entered in the Patient data entry menu, automatically appears on the report page.

GA (Gestational Age): The GA, entered in the patient data entry menu, automatically appears on the report page.

Gravida (total number of pregnancies): The Gravida, entered in the patient data entry menu, automatically appears on the report page.

Para (total number of deliveries): The Para value, entered in the patient data entry menu, automatically appears on the report page.

OB Specific Measurements

BPD: The Biparietal Diameter in mm, last measured or averaged, automatically appears on the report page. The GA, as per the Hadlock table, is given in weeks and days.

HC: The Head Circumference in mm, last measured or averaged, automatically appears on the report page. The GA, as per the Hadlock table, is given in weeks and days.

OFD: The Occipito Frontal Diameter, calculated from HC, automatically appears on the report page.

AC: The Abdominal Circumference in mm, last measured or averaged, automatically appears on the report page. The GA, as per the Hadlock table, is given in weeks and days.

TAD and APD (Transverse Abdominal Diameter and Abdominal Anterior-Posterior Diameter): The TAD and APD are obtained only when the abdominal circumference is measured by either the two distance or ellipse methods. The Trace method does not give TAD or APD. In either case, TAD is the first distance measured and APD the next.

FL: The Femur Length, last measured or averaged, automatically appears on the report page. The EGA, as per the Hadlock table, is given in weeks and days.

CRL: The Crown Rump Length, last measured or averaged, automatically appears on the report page. The EGA, as per the Hadlock table, is given in weeks and days.

CI (Cephalic Index): The ratio of BPD to OFD (Occipito Frontal Diameter)

Cephalic Index (%) = 100 x BPD / OFD Cephalic index's normal value is 79±8%.

NOTE: *The HC should have been measured for calculation of Cephalic Index. The OFD is taken as the long axis of HC. If HC has been measured by the trace method, then the Cephalic Index is not calculated.*

OB Specific Measurements (continued)

FL/BPD: The ratio of femur length to biparietal diameter, in percent. The displayed values are used for calculation. If either is missing, the field is blank. FL/BPD normal ratio is 79±8% (23 weeks to term).

FL/AC: The ratio of femur length to abdominal circumference, in percent. The displayed FL and AC values are used for the calculation. If either is missing, the field is blank. FL/AC normal ratio is 22± 2% (21 weeks to term).

HC/AC: The ratio of head circumference to abdominal circumference, in percent. The displayed HC/AC values are used for the calculation. If either is missing, the field is blank. HC/AC normal ratio varies throughout the pregnancy.

EFW: Estimated Fetal Weight in grams.

HR: Fetal Heart Rate calculated in beats per minute. If this measurement is not made, the field appears blank.

AFI: Amniotic Fluid Index in mm/cm.

Three lines of comments can be entered on the report page.

Calculations

The following calculations described in this section, automatically calculated if certain measurements have been performed, display on the report page.

Estimated Date of Confinement (EDC/EDD)

Use this method to arrive at the Estimated Date of Confinement from Gestational Age (GA).

In the US Report page, the LMP and EDD are calculated and displayed using the “GA” value entered in patient data entry menu.

EDD (GA): It is the estimated delivery date computed from the estimated gestational age at the time of the exam. This is dependent on the value entered above and is calculated using the formula:

EDD (GA) = {Exam date} - {GA} + {40 weeks or 41 weeks as selected in setup}

Estimated Fetal Weight (EFW)-US

The Estimated Fetal Weight is arrived at by five possible methods.

Table 9-2: Estimated Fetal Weight Methods

EFW Method	Measurements Used
EFW (BPD/AC)	BPD, AC
EFW (FL/AC)	FL, AC
EFW (BPD/AC/FL)	BPD, AC, FL
EFW (FL/AC/HC)	FL, AC, HC
EFW (FL/AC/HC/BPD)	FL, AC, HC, BPD

Estimated Fetal Weight (BPD/AC)

The Estimated Fetal Weight (BPD/AC) is computed using Shepard, AJOG, 142:47, 1982

Estimated Fetal Weight is determined according to the equation:

EFW=10^(-1.7492+0.166*BPD+(0.046*AC)-((2.646*AC*BPD)/1000))

The above formula yields Estimated Fetal Weight in grams. This calculation is made only if BPD/AC measurements are the only available measurements.

Estimated Fetal Weight (EFW)-US (continued)

Estimated Fetal Weight (FL/AC)

The Estimated Fetal Weight (FL/AC) is computed using the Hadlock model. (Hadlock, F.P., et al, : “Sonographic Estimation of Fetal Weight”, Radiology, 152: 497-501)

EFW is determined according to the equation:

EFW=10^(1.304 + (0.05281’AC) + (0.1938’FL)- (0.004’AC’FL))

The above formula yields EFW in grams when the AC and FL are in centimeters.

This calculation is made only if FL/AC are the only available measurements within the set BPD/HC/AC/FL

Estimated Fetal Weight (BPD/AC/FL)

The Estimated Fetal Weight (BPD/AC/FL) is computed using a Hadlock, Harris, Sharman,Deter and Park model. “Estimation of fetal weight with the use of head, body and femur measurements-A prospective study”. (American Journal of Obstetrics and Gynecology 151: 333, 1985)

EFW is determined according to the equation:

EFW=10^(1.335- (0.0034’AC’FL) + (0.0316’BPD) + (0.457’AC) + (0.1623’FL)).

The above formula yields EFW in grams when the BPD, AC and FL are in centimeters.

This calculation is made only if BPD/AC/FL are the only available measurements.

Estimated Fetal Weight (EFW)-US (continued)

Estimated Fetal Weight (FL/AC/HC)

The Estimated Fetal Weight (FL/AC/HC) is computed using a Hadlock, Harris, Sharman, Deter and Park model. “Estimation of fetal weight with the use of head, body and femur measurements-A prospective study”. (American Journal of Obstetrics and Gynecology 151: 333-337, 1985)

EFW is determined according to the equation:

EFW=10^(1.326-0.00326*AC*FL)+(0.0107*HC)+(0.0438*AC)+(0.158*FL)

The above formula yields EFW in grams, when the FL, AC and HC measurements are in cm.

This calculation is made only if FL/AC/HC are the only available measurements.

Estimated Fetal Weight (EFW)-US (continued)

Estimated Fetal Weight (BPD/HC/AC/FL)

The Estimated Fetal Weight (BPD/HC/AC/FL) is computed using a Hadlock, Harris, Sharman,Deter and Park model. “Estimation of fetal weight with the use of head, body and femur measurements-A prospective study”. (American Journal of Obstetrics and Gynecology 151: 333, 1985) EFW is determined according to the equation:

EFW=10^(1.3596-(0.00386*AC*FL)+(0.0064*HC) +(0.00061*BPD*AC)+(0.0424*AC)+(0.174*FL)

The above formula yields EFW in grams, when the BPD, HC, AC and FL measurements are in cm. When EFW is selected, this calculation is made only if BPD/HC/AC/FL are the only available measurements.

The Estimated Fetal Weight (BPD/HC/AC/FL) is computed using a Hadlock, Harris, Sharman, Deter and Park model. “Estimation of fetal weight with the use of head, body and femur measurements-A prospective study”. (American Journal of Obstetrics and Gynecology 151: 333-337, 1985)

EFW is determined according to the equation:

EFW=10^(1.326-0.00326*AC*FL)+(0.0107*HC)+(0.0438*AC)+ (0.158*FL)

The above formula yields EFW in grams, when the FL, AC and HC measurements are in cm.

This calculation is made only if FL/AC/HC are the only available measurements.

Tokyo University Report Page Format

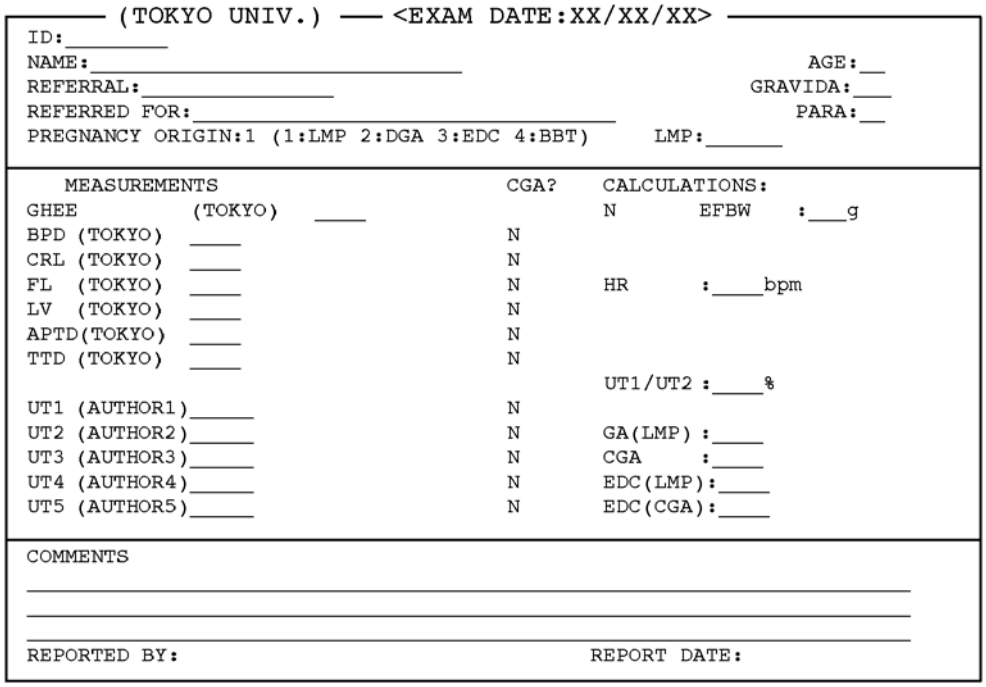


Figure 9-20. Tokyo University Version Report Page

The Patient and OB Exam information does not differ by report. See ‘Patient Information’ on *page 9-33* and ‘OB Exam Information’ on *page 9-33* for details.

Tokyo University Report Page Format (continued)

Pregnancy Origin: The Pregnancy origin, entered in Patient data entry, automatically appears on the report page.

NOTE: EDC has been calculated and displayed in the report page.

BBT: Enter the date from the first day of the patient's LMP prior to pregnancy (e.g. LMP date + 2 weeks).

NOTE: If the four-digit format is used to enter the year, the system ignores the first two digits of the year.

GA (Pregnancy Origin): Depending on the parameter chosen for pregnancy origin, the Gestational Age is calculated as described below:

- GA (LMP): If LMP is selected in Pregnancy Origin, the field GA (LMP) appears. The Gestational Age by Last Menstrual Period is computed from the date of the first day of the Last Menstrual Period, according to the formula:

  GA (LMP) = {Exam date} - {Last menstrual period}
- GA (EDC): If EDC is selected in Pregnancy Origin, the field GA (EDC) appears. The Gestational Age by Expected Date of Confinement is computed from the formula:

  GA (EDC) = {EDC} + {Exam date} - {40 weeks or 41 weeks as selected in setup}
- GA (BBT): The Gestational Age by Basal Body Temperature is computed using the formula:

  GA (BBT) = {Exam date} - {BBT} + 2 weeks
- EDC (GA): If GA is selected in Pregnancy Origin, it appears as EDC by GA. Estimated Date of Confinement is computed using the formula:

  EDC (GA) = {Exam date} - {GA} + {40 weeks or 41 weeks as selected in setup}

Other Fields: All other fields are similar to the US Report Page except that the Tokyo University tables are used in the calculation of Gestational Age.

Calculations

Estimated Fetal Weight (EFW)-Tokyo University

The Estimated Fetal Body Weight (displayed in grams) is computed using the distance measurements (displayed in cm) of BPD, APTD (Anteroposterior Trunk Diameter), TTD (Transverse Trunk Diameter) and FL. These measurements have to be completed first to arrive at the computation. Calculations are done based on the last measurement made. If any of these measurements are not available, the EFW field is blank.

Estimated Fetal Body weight is computed using a Todai model (Tokyo University).

EFW = 1.07 x BPD^3 + 3.42 x APTD x TTD x FL

Osaka University Report Page Format

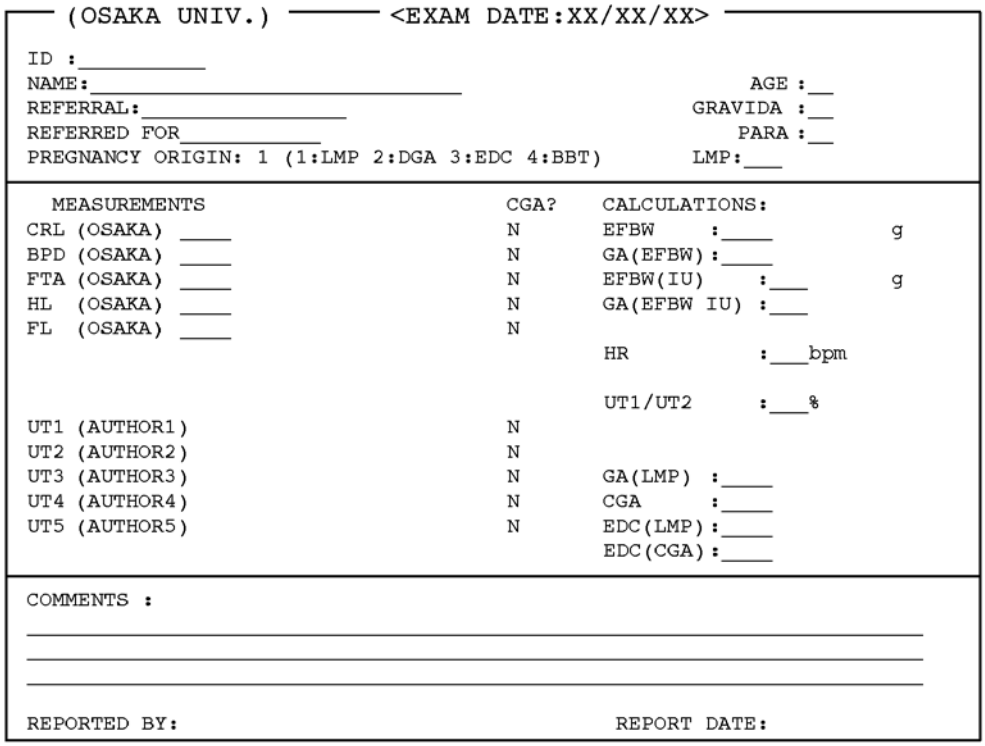


Figure 9-21. Osaka University Version Report Page

Osaka University Report Page Format (continued)

The Patient and OB Exam information does not differ by report. See ‘Patient Information’ on *page 9-33* and ‘OB Exam Information’ on *page 9-33* for details.

Pregnancy Origin: The pregnancy origin field is similar to the Tokyo University report. See ‘Tokyo University Report Page Format’ on *page 9-40 for more information.*

Other Fields: All other fields are similar to US or Tokyo versions except that Osaka University tables are used in Gestational Age estimation.

Calculations

Estimated Fetal Weight (EFW)-Osaka University

The Estimated Fetal Weight is computed using two distance calculations (BPD & FL) and one area calculation (FTA). These measurements have to be completed first to arrive at the computation. Calculations are made based on the last measurement made. If any of these measurements are not available, the EFW field is blank.

Select appropriate numeric key in the Measurement Menu for Estimated Fetal Body Weight. The calculation appears for BPD, FL and FTA in the Measurement Summary Window.

EFW [gm] = 1.25647 x BPD[cm]3 + 3.50655 x FTA[cm2] x FL[cm] + 6.3

EFW (IU): If the standard deviation value for EFW is greater than 1.5, the EFW (IU) is computed using the formula: EFW (IU) [gm] = 1.229 x BPD[cm]3 + 3.063 x FTA[cm2] x FL[cm] - 24.6
GA (EFW(IU)): Based on the calculations made for EFW(IU), the GA by EFW (IU) is automatically computed.

European Version Report Page Format

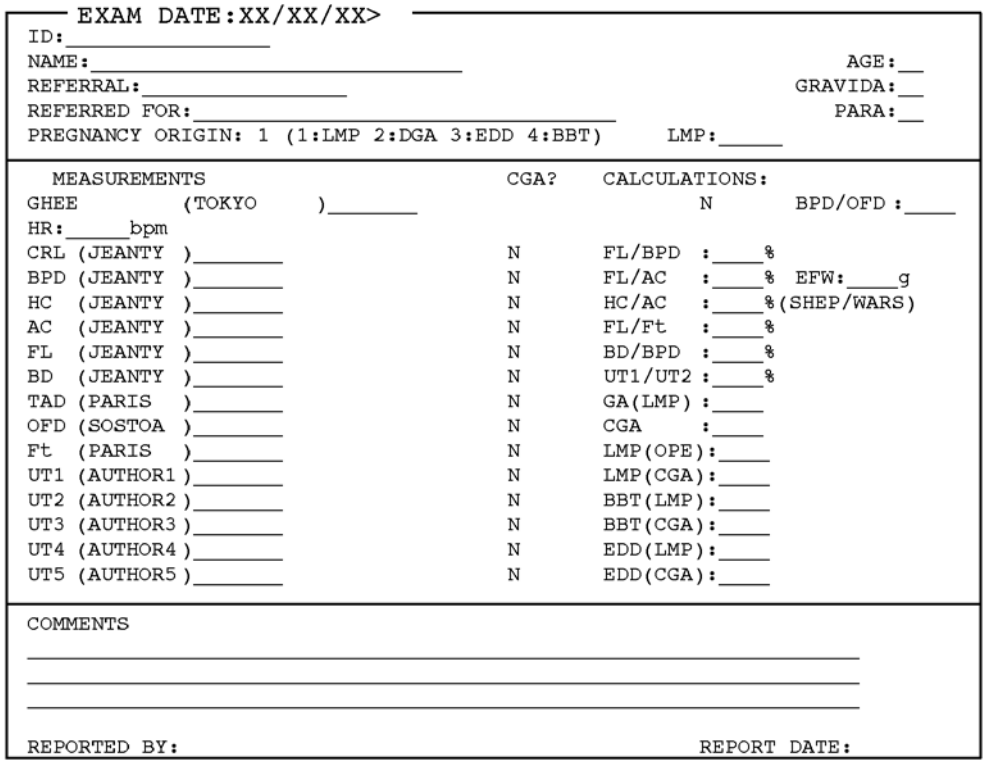


Figure 9-22. European Version Report Page

The Patient and OB Exam information does not differ by report. See ‘Patient Information’ on *page 9-33* and ‘OB Exam Information’ on *page 9-33* for details.

Pregnancy Origin: The pregnancy origin field is similar to the Tokyo University report. See ‘Tokyo University Report Page Format’ on *page 9-40 for more information.* Expected Date of Confinement (EDC) is referred here as Expected Date of Delivery (EDD).

European Version Report Page Format (continued)

OB Specific Measurements

CI: Cephalic Index. Ratio of BPD to OFD (Occipito Frontal Diameter) in percent.

Cephalic Index (%) = 100 x BPD / OFD

Cephalic index's normal value is 79±8%.

NOTE: The HC should have been measured for calculation of Cephalic Index. The OFD is taken as the long axis of HC. If HC has been measured by the trace method, then the Cephalic Index is not calculated.

FL/BPD: Femur Length/Biparietal Diameter in percentage. The displayed values are used for calculation. If either is missing, the field is blank. The normal ratio of FL/BPD is 79 ±8% (23 weeks to term).

FL/AC: Femur Length/Abdominal Circumference in percentage. The displayed FL and AC values are used for the calculation. If either is missing, the field is blank. The normal ratio of FL/AC is 22± 2(21 week to term).

HC/AC: Head Circumference/Abdominal Circumference in percentage. The displayed HC/AC values are used for the calculation. If either is missing, the field is blank. HC/AC normal ratio varies throughout the pregnancy.

FL/Ft: Femur Length/Foot Distance. FL/Ft is the ratio of femur length to Ft, in percent. The displayed values are used for calculation. If either is missing, the field is blank.

BD/BPD: Binocular Distance/Biparietal Diameter. BD/BPD is the ratio Binocular Distance to Biparietal Diameter in percent. The displayed values are used for calculation. If either is missing, the field is blank.

Other Fields: All other fields are similar to US or Tokyo versions.

Calculations

Estimated Fetal Weight (EFW)-European

The Estimated Fetal Weight is arrived at by four possible methods: BPD/AC (Shepard/Warsoff), BPD/AC (Shepard:Richards/Berkowitz), FL/AC/HC (Hadlock, Radiology 150:535:1984) and BPD/TAD (German). Calculations are made based on the last measurement done.

If any of the above Measurements are not available, the report page display EFW as blank.

Estimated Fetal Weight (BPD/AC) (Shepard/Warsoff Model)

Estimated Fetal Weight is determined according to the equation:

EFW[gm]=10^(1.7288+0.09184*BPD[cm]+(0.02581*AC[cm]) +(0.00011*BPD[cm] *AC[cm]).

The above formula yields Estimated Fetal Weight in grams. This calculation is made only if BPD/AC measurements are already available.

Estimated Fetal Weight (BPD/AC) (Shepard:Richards/ Berkowitz)

Estimated Fetal Weight (Shepard:Richards/Berkowitz Model) is determined according to the equation:

EFW[g]=10^(3-1.7492+(0.046*AC[cm])+(0.166*BPD[cm])-(0.002646*AC[cm] *BPD[cm]).

The above formula yields Estimated Fetal Weight in grams. This calculation is made only if BPD/AC measurements are already available.

Estimated Fetal Weight (EFW)-European (continued)

Estimated Fetal Weight (FL/AC/HC) (Hadlock, Radiology 150:535,1984)

The Estimated Fetal Weight (EFW) is computed using a Hadlock, Radiology 150:535,1984 model.

EFW is determined according to the equation:

EFW[g]=10^(1.5662-(0.0108*HC[cm])+(0.0468*AC[cm] +0.171*FL[cm])+(0.00034*(HC[cm])^2)-(0.003685* AC[cm]*FL[cm]).

The above formula yields EFW in grams, when the FL, AC and HC measurements are in cm. This calculation is made only if FL/AC/HC measurements are already available.

Estimated Fetal Weight (BPD/TAD) (German)

Estimated Fetal Weight is determined according to the equation:

EFW[kg]=0.515263-(0.105775*BPD[mm])+ 0.000930707*(BPD[mm]^2)+(0.0649145*TAD[mm])- (0.00020562*(TAD[mm])^2).

The above formula yields Estimated Fetal Weight in kg.

This calculation is made only if BPD/TAD measurements are already available.

ASUM Report Page Format

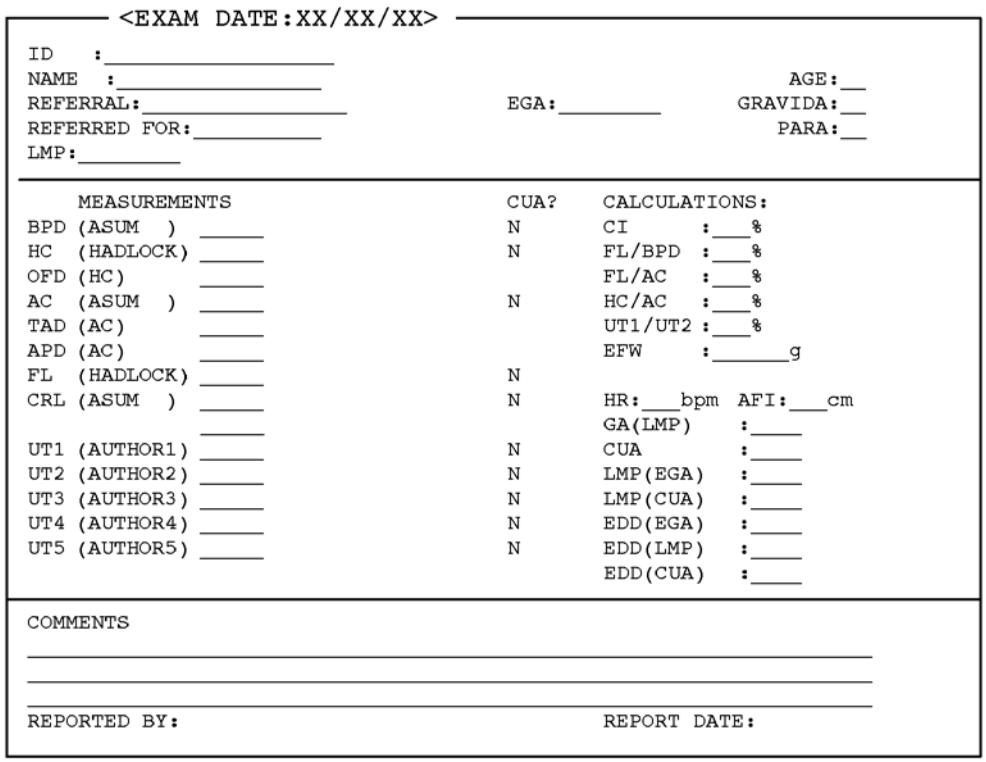


Figure 9-23. ASUM Version Report Format

All fields are identical to US report page. BPD, CRL and AC measurements alone use Australian tables instead of Hadlock tables.

Measurement Averaging Page

Overview

The Measurement Averaging Page enables the display and selection of measurement values, that will be included or excluded from the data, to be used in the calculation of results displayed on the main OB Report Page.

Press the DR up pad key while displaying the OB Report Page to display the Measurement Averaging Page.

Press the DR up pad key again to exit the Measurement Averaging Page.

The choices to be entered for USE fields on the Report Display are:

Y - Use this measurement for averaging

N - Do not use this measurement for averaging

D - Erase or delete this measurement

NOTE: If there is no measurement with a 'Y', the average will not be displayed.

Measurement Averaging Page Examples

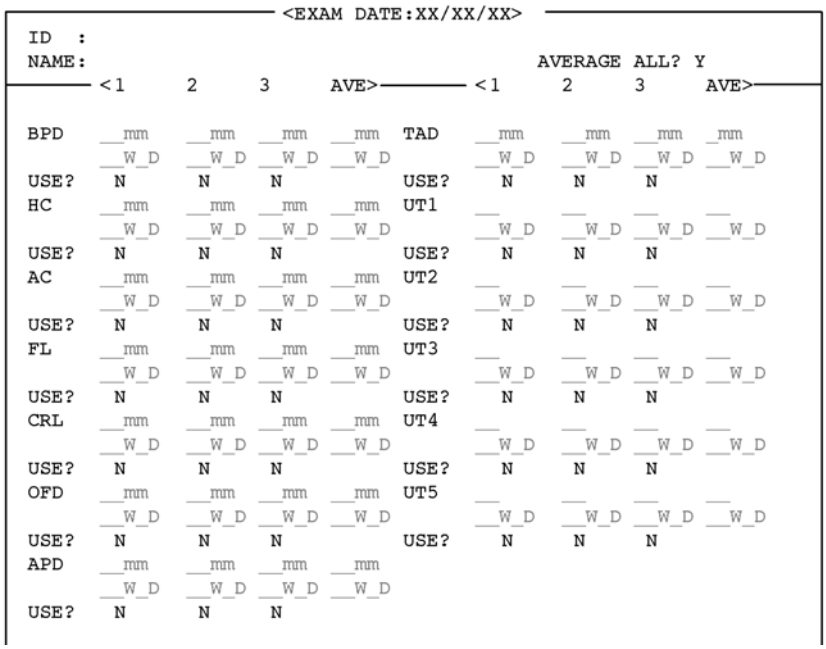


Figure 9-24. US and ASUM Report

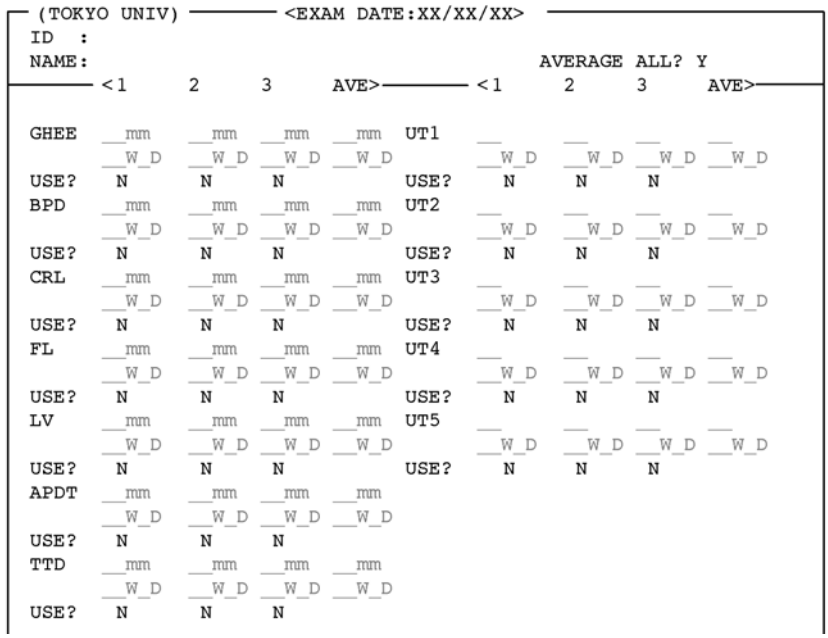


Figure 9-25. Tokyo University Detailed Report

Measurement Averaging Page Examples (continued)

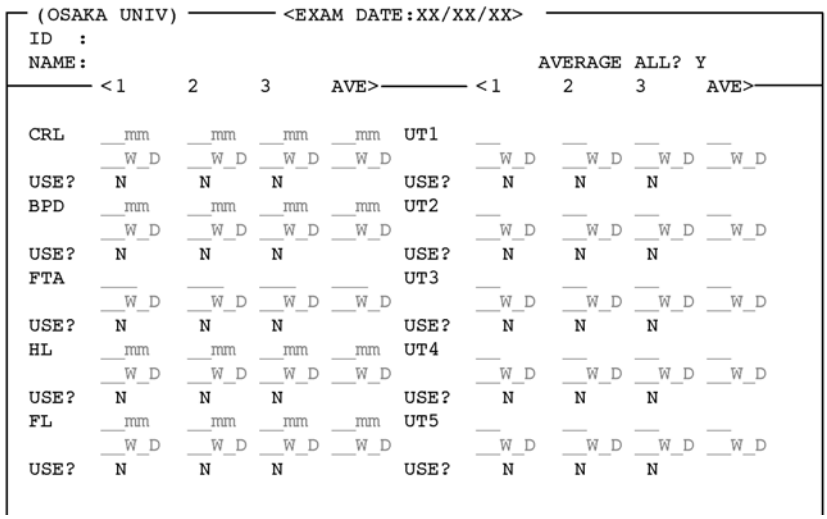


Figure 9-26. Osaka University Detailed Report

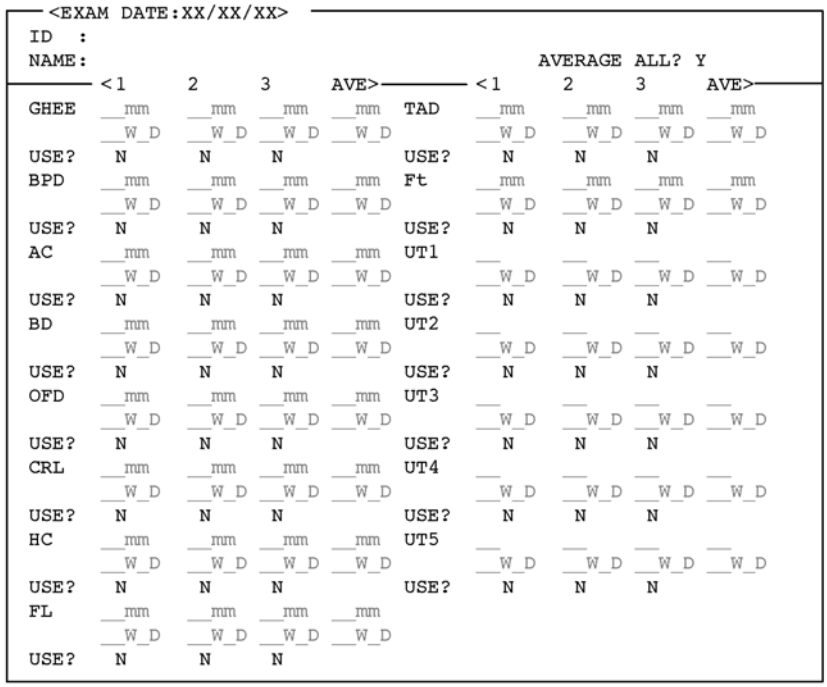


Figure 9-27. European Detailed Report

Editing the Measurement Averaging Page

Edit the Measurement Averaging Page in the same manner as the OB Report Page.

Only USE fields can be edited.

Measurements displayed on the report cannot be edited. However, if ‘N’ or ‘D’ is entered in the USE field, this could exclude or delete specific measurements.

Average All

The default state for the measurement USE fields is selected by the “AVERAGE ALL” field. If the “AVERAGE ALL” field is ‘N’ (no) then the two prior measurements will be ‘N’. ‘N’ is the factory and service default setting for the AVERAGE ALL field. If the Measurement Averaging Page is never used, the AVERAGE ALL selection is likely to be ‘N’ (no).

If the AVERAGE ALL field is set to ‘Y’, the default for all measurement USE fields will be ‘Y’. It is assumed that all measurements (up to two) will be averaged as a matter of regular procedure.

Anatomical Survey Page

Overview

The Anatomical Survey Page provides a checklist that indicates which anatomy was imaged and its appearance.

To access this page, use the DR up/down key to enter from the OB Report Page to the Measurement Averaging Page and finally to the Anatomical Survey Page. Follow the reverse process to exit out of the Anatomical Survey Page or press Control/Enter.

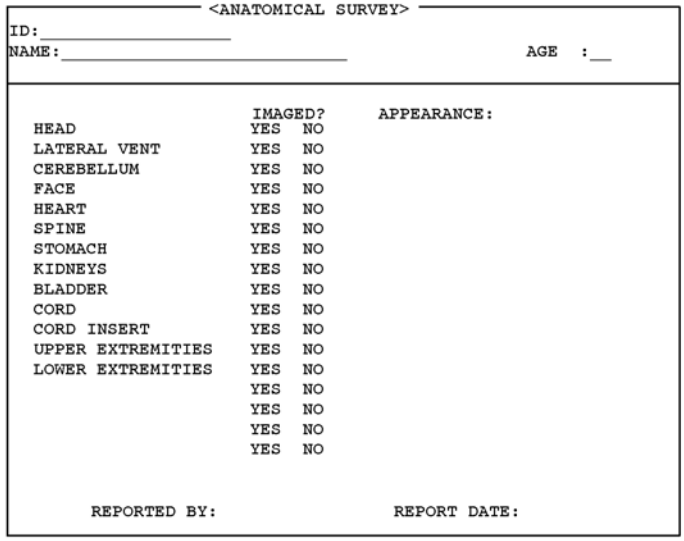


Figure 9-28. Anatomical Report Page

Editing the Anatomical Survey Page

The cursor appears by default at the ‘YES/NO’ field on the first feature of the checklist. Edit the Anatomical Survey page in the same manner as the OB Report Page. Yes/No is selected for the active anatomical feature by pressing ‘Y’ for selection or ‘N’ for no selection.

If ‘Yes’ is selected, then the ‘No’ will be erased. The cursor will automatically move to the ‘Appearance’ field. Up to 24 characters can be entered in the Appearance field.

User Features

The user can edit up to four additional anatomical features to the list. Use the Trackball to move to a blank field. Type in the desired anatomical feature designation. Edit the YES/NO and Appearance fields as indicated above.

NOTE: The Anatomical comments edited by the user will NOT be retained when the system is turned OFF or new patient selected.

OB Trend Graph Page

Overview

The LOGIQ 100 PRO can display a fetal growth curve graph from data in each measurement table or fetal age.

To reach the page, press the DR up/down key to enter from the OB Report Page to the Measurement Averaging Page, to the Anatomical Survey Page and finally to the OB Trend Graph Page. Follow the reverse process to exit out of the OB Trend Graph Page or press Control/Enter or Clear key.

The graphic displays a horizontal line for gestational weeks and a vertical scale for the measurement value. The curve shows the standard values with two additional curves representing the standard deviation.

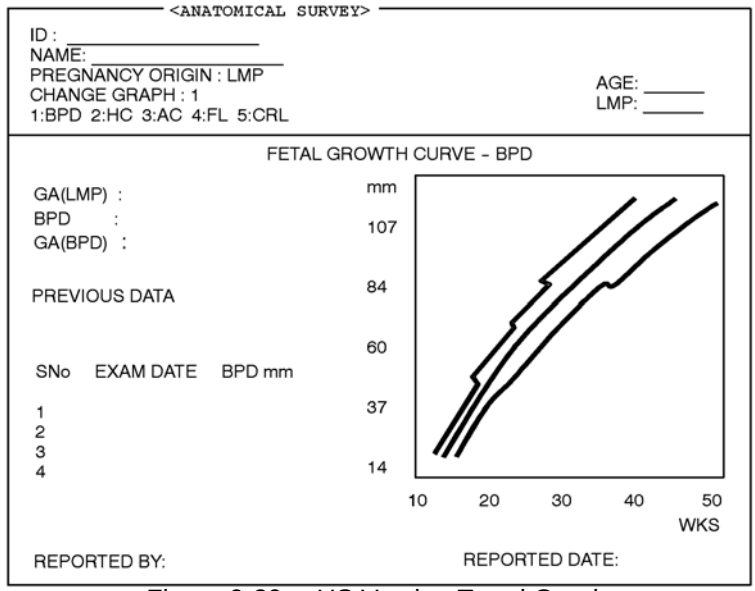


Figure 9-29. US Version Trend Graph

OB Trend Graph Page (continued)

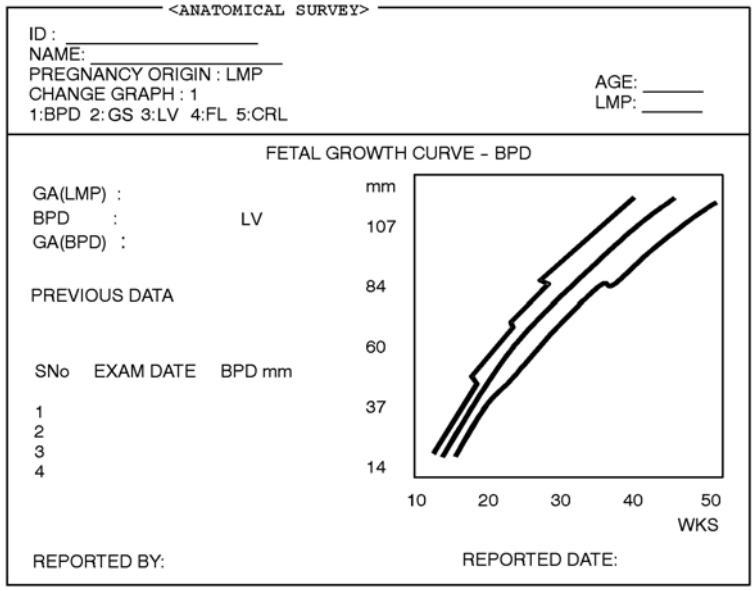


Figure 9-30. Tokyo University Trend Graph

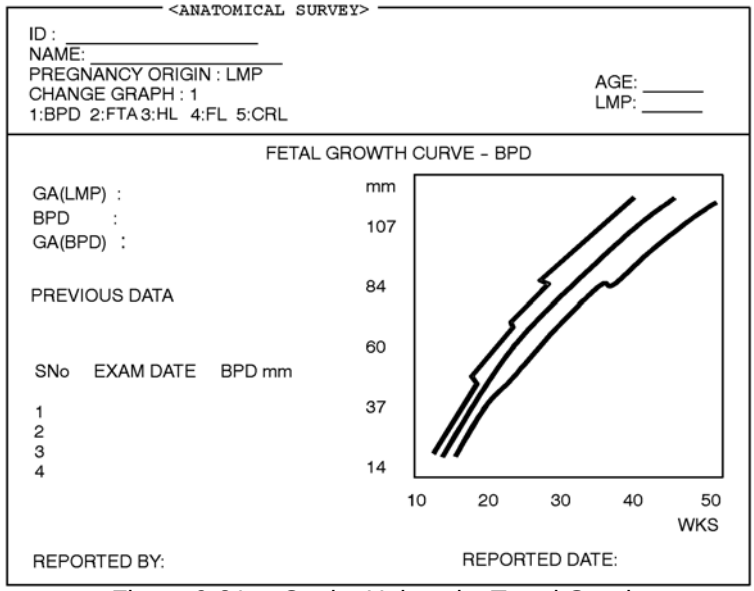


Figure 9-31. Osaka University Trend Graph

OB Trend Graph Page (continued)

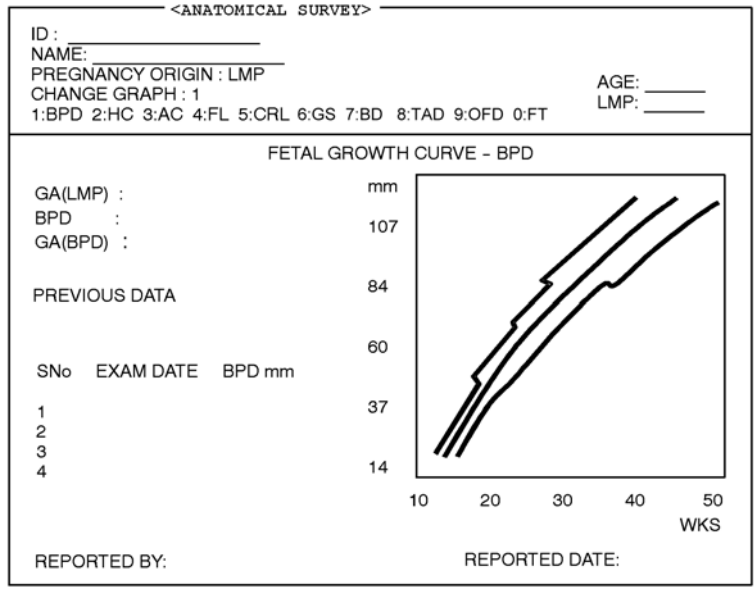


Figure 9-32. European Version Trend Graph

If the information was entered on the patient data entry menu that allows for the estimation of gestational age, an asterisk(*) is displayed on the graph to show the current status of the fetus relative to the measurement table.

The system does not allow any field on the OB Trend Graph to be edited except the comment area.

To exit the Trend Graph display, Press clear or DR up/down key to move to Anatomical Survey Page.

NOTE: The LMP is required to compute the OB Trend Graph. Ensure that the LMP is properly entered in the Patient Entry Menu.

OB Trend Graph Labeling

To change the graph:

With the OB Trend Graph displayed, use the Trackball to select the CHANGE GRAPH menu and type the number of the measurement. The graph changes as per the measurement.

Table 9-3: OB Graph Deviation Labeling

Author	Measurement Table	Deviation	Deviation Label
Hadlock	BPD,HC,AC,FL	Vertical	+2SD/-2SD
	CRL		No Label
	EFW	Vertical	+2SD/-2SD
ASUM	BPD,AC	Horizontal	90%/10%
	CRL		No Label
Tokyo	GS,CRL,BPD,EFL,LV	Horizontal	Deviation (week)
Osaka	CRL,BPD,FL,FTA,EFW	Vertical	+1.5SD/-1.5SD
Hansmann	BPD,CRL,OFD,HC,FL	Vertical	95%/5%
	GS,TAD	Vertical	90%/10%
	AC		No Label
Campbell	BPD,CRL,FL	Vertical	90%/10%
	BD		No Label
Berkowitz	BD		No Label
Kurtz	BPD	Vertical	90%/10&
Nelson	CRL	Vertical	90%/10%
Jeanty	CRL,BPD,FL,AC,HC	Vertical	90%/10%
	BD		No Label
Paris	FT	Vertical	90%/10%
Sostoa	BPD.FI.AC,HC	Vertical	90%/10%
	BD,OFD		No Label

Obstetrics User Tables

Overview

With the advancement of sonography numerous obstetric tables specific for certain racial or geographical populations have evolved. These offer an advantage in the form of higher calculation accuracies (such as estimated fetal birth weight) and in earlier diagnosis (such as intra-uterine growth retardation) compared to other tables constructed from a genetically different or heterogeneous population.

Specifications

The LOGIQ 100 PRO offers five user tables. The following are the speciifcations for user tables:

- The input parameter could be one among the following types:
  - Distance
  - Circumference
  - Area
- The variation of input parameter can be one among the following:
  - Range (time)
  - Standard Deviation
- The output parameter is calculated GA.
- The statistical expression of the output can be one among the following formats:
  - Range (time)
  - Standard Deviation
  - Percentile Score
- Linear interpolation to determine missing data points.

OB Table Editor

The LOGIQ 100 PRO user table editor as shown below:

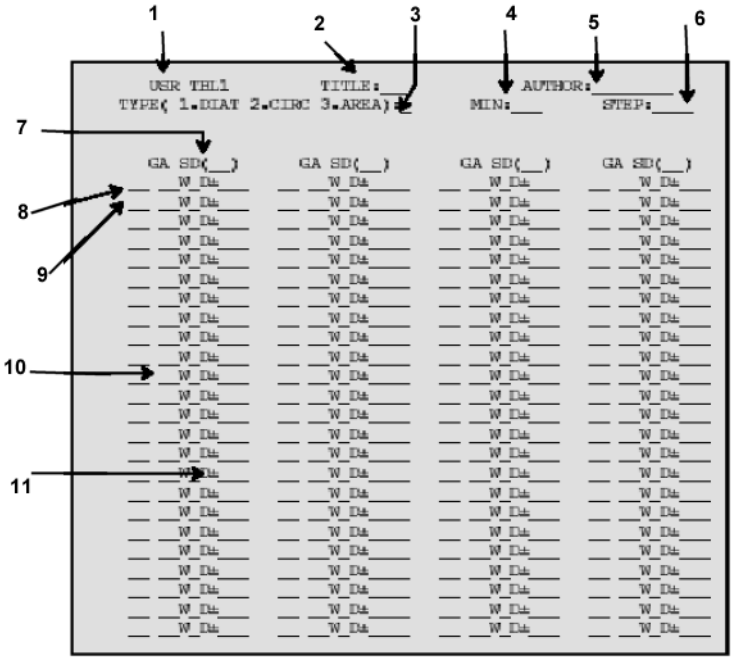


Figure 9-33. OB Table Editor

1. User Table Number (Non Editable)
2. Title of user table
3. Measurement type
4. Min value
5. The Author of User Table
6. Step Value
7. Input parameter statistical format
8. First value
9. Second value
10. Gestational Age
11. Input parameter statistical entry

NOTE: Italic descriptives denote non-editable fields.Italic Bold descriptives denote editable fields.

Entering OB Table Data

The statistical type of the data sheet has to be identified before the data can be copied to the system.

Identifying the statistical type

The statistical expression of variation of input parameter has to be obtained. The variation of input parameter can either be:

- Range of Calculated Gestational Age (e.g. US table)
- Standard deviation of input parameter (e.g. Europe, Osaka tables).

Choosing the statistical expression (CGA)

The ultimate aim of the user table is to not only give the accurate Gestational Age for a sonographic measurement, but also give reliable information on whether the measurement is normal for the DGA or otherwise. The statistical expression of the output (Calculated Gestational Age) can be in one of the following formats:

- Range (time)
- Percentile
- Standard deviation

Range (time) This format displays the normal range of GA for a particular obstetric measurement. It does not give information on whether the fetus is normal for date or not.

Percentile The percentile score not only describes whether the fetus is normal but also shows tangibly where exactly it stands in a percentile ranking.

A percentile score of 50% is right in middle. A score below 10th percentile is considered small for date and a score above 90 is considered large for date.

Standard Deviation

This format gives the gestational age and the normalcy of growth in statistical parlance. It expresses the discrepancy between DGA and sonological measurement in form of 'number' of times the standard deviation (s times)'. A difference of up to 2 standard deviations (2s) is considered normal. s times above 2 is considered large for date and s times below 2 is considered small for date as far as the particular sonographic measurement is considered.

s times is calculated using the formula:

$$\sigma\ times\ = \frac{x_{table} - x}{\sigma}$$

s = standard deviation for DGA as in data sheet

xtable is the data sheet value for DGA

x is the sonographically measured parameter

Choosing the output format

The statistical expression of the output depends on the statistical format of the input parameter.

Table 9-4: Choosing Output Format

Output Format	Variation of inputparameter	Remark
Range	Range	Similar to US, Tokyo, and ASUM
Standard Deviation	Standard Deviation	Similar to Osaka
Percentile Score	Standard Deviation	Similar to Europe

NOTE: Choose the output format before copying data from data sheet to system. Output format once chosen for a table will remain so until entirely erased.

To choose the format:

- Press “Control S” 1.
- Press “Enter”. The setup screen displays on the screen.
- Statistical expression of output by selecting ob version as any of the following:
  - Select ‘1/2/5’ US (Or Australian or Tokyo) for Statistical expression of output as range (time).
  - Select ‘2’ Osaka for output format as Standard Deviation.
  - Select ‘3’ Europe for output format as Percentile Score.
- Press “Set”. The selected output format is saved to the system.

Copying Data to User Table

Invoke the Table Editor using the following keys:

- Press “Control G”.
- Select the appropriate user table:
  - 1 for user table1
  - 2 for user table 2
  - 3 for user table 3
  - 4 for user table 4
  - 5 for user table 5
- Press “Enter” to invoke Table Editor.

Use Trackball, Shift, Arrow, Return, and Space to fill up the title, author, type of input parameter, minimum value, maximum value and step by which the input parameter varies as given in the data sheet. Copy the data to the system.

Press “Enter” to save User Table data to the system.

Linear Interpolation

The linear interpolation facility offers advantage in form of calculating gestational age, range and standard deviation for measurement values that are not in the user table.

Illustration

Consider the case where the STEP in your user table is 5mm. Then for every four of the five obstetric measurements the table gestational age is missing. Using linear interpolation the system calculates gestational age, range and standard deviation for the intervening measurement values.

Measurement with User Table

NOTE: Ensure that the diagnostic category is OB.

- Scan and obtain a frozen section corresponding to the input parameter in the user table.
- Press Measurement key. The user table measurement menu displays on the screen.

Figure 9-34. User Table Measurement Menu

- Select appropriate numeric key.
- Perform Distance/Circumference/Area as per input type selected.

On completing measurement the Gestational Age and accuracy is displayed on the screen.

Invoking Report Page

The user table measurements are automatically incorporated in the OB report and averaging pages. They appear below the standard OB measurements irrespective of version chosen.

An additional item in the form of ratio between user table #1, and user table number #2 is present in the report page. When both tables are entered and both measurements are made the ratio is calculated and displayed automatically.

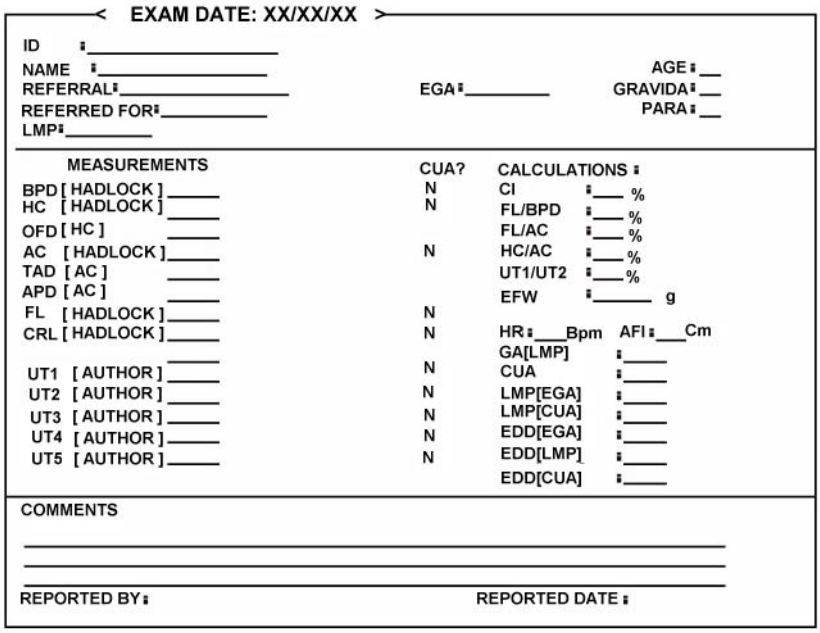


Figure 9-35. US Report Page

Erasing User Table

To permanently erase a User Table from the system use CONTROL-E sequence.

- Press “Control E”.
- Select the user table number.
  - 1 for user table 1
  - 2 for user table 2
  - 3 for user table 3
  - 4 for user table 4
  - 5 for user table 5
- Select “Enter” to erase the selected user table.

  The table once cleared is available for entering new OBtables.

Chapter 10

Gynecology

Describes how to perform gynecology measurements and calculations, and how to use gynecology report pages.

Gynecology Measurements

Introduction

Measurements and calculations derived from ultrasound images are intended to supplement other clinical procedures available to the attending physician. The accuracy of measurements is not only determined by the system accuracy, but also by use of proper medical protocols by the user. When appropriate, be sure to note any protocols associated with a particular measurement or calculation. Formulas and databases used within the system software that are associated with specific investigators are so noted. Be sure to refer to the original article describing the investigator's recommended clinical procedures.

Calculation formulas are available in the Measurement Formulas chapter of advanced reference manual.

General Guidelines

New Patient information must be entered before beginning an exam. See ‘Beginning an Exam’ on *page 4-2 for more information.*

Any measurement can be repeated by selecting that measurement again from the control menu.

After pressing the Measure key, the gynecology measurement screen appears on the screen. Press the appropriate numeric key to perform the respective measurements. Press numeric Key “0” to display the next available gynecology measurements.

Gynecology Measurements

The Gynecology exam category includes the following two studies:

- General Gynecology: This study includes uterine, ovarian, ovarian follicle, and endometrium measurements.
- Generic Measurements.

NOTE: In B/M-Mode, the B-Mode measurements can be made only on the B-Mode area of the screen. Similarly, the M-Mode measurements can be made only on the M-Mode screen area. The M-Mode measurements cannot be performed in a B or B/B screen area and vice versa.

Gynecology Measurements

Gynecology Measurement are done by Distance or Ellipse methods.For Measurements supporting Volume Calculation, the result volume is displayed automatically after the required measurements are done.

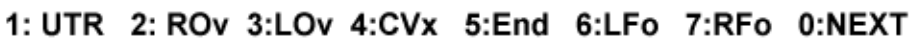


Figure 10-1. Gynecology Measurement Menu

Uterus Volume (UTR) Measurement — Perform the UT with a volume measurement. See ‘Volume Measurement’ on *page 7-14 for more information.*.

Endometrium Thickness (End) — Perform the END with a one distance measurement. See ‘One Distance Measurement’ on *page 7-6* for more information on how to perform one distance measurements.

Cervix Measurement (CX)	Perform the CX with a one distance measurement. See ‘One Distance Measurement’ on *page 7-6* for more information on how to perform one distance measurements.
Right Ovary (ROv) Measurement	Perform the Rt Ov with a volume measurement. See ‘Volume Measurement’ on *page 7-14 for more information.*.
Left Ovary (LOv) Measurement	Perform the Lt Ov with a volume measurement. See ‘Volume Measurement’ on *page 7-14 for more information.*.
Right Follicle (RFo) Measurement	Perform the Rt Foll with a volume measurement. See ‘Volume Measurement’ on *page 7-14 for more information.*.
Left Follicle (LFo) Measurement	Perform the Lt Foll with a volume measurement. See ‘Volume Measurement’ on *page 7-14 for more information.*.

Generic Measurements

C&A(Area) Measurement	See ‘Area Measurement’ on *page 7-13 for more information.*
VLM(Volume) Measurement	See ‘Volume Measurement’ on *page 7-14 for more information.*
A/B (Ratio) Measurement	See ‘A/B Ratio’ on *page 7-15 for more information.*
Heart Rate Measurement	See ‘Heart Rate’ on *page 7-17 for more information.*
Veocity Measurement	See ‘Velocity Measurement’ on *page 7-18 for more information.*
Time Measurement	See ‘Time Interval Measurement’ on *page 7-11 for more information.*

Gynecology Report Pages

Overview

The following gynecology reporting pages are available for the LOGIQ 100 PRO:

- Gynecology Report
- Gynecology IVF Report

Gynecology Report Page

Pressing “Control R” displays the gynecology report page while in the gynecology exam category.

The last measured measurements are automatically transferred to the report page.

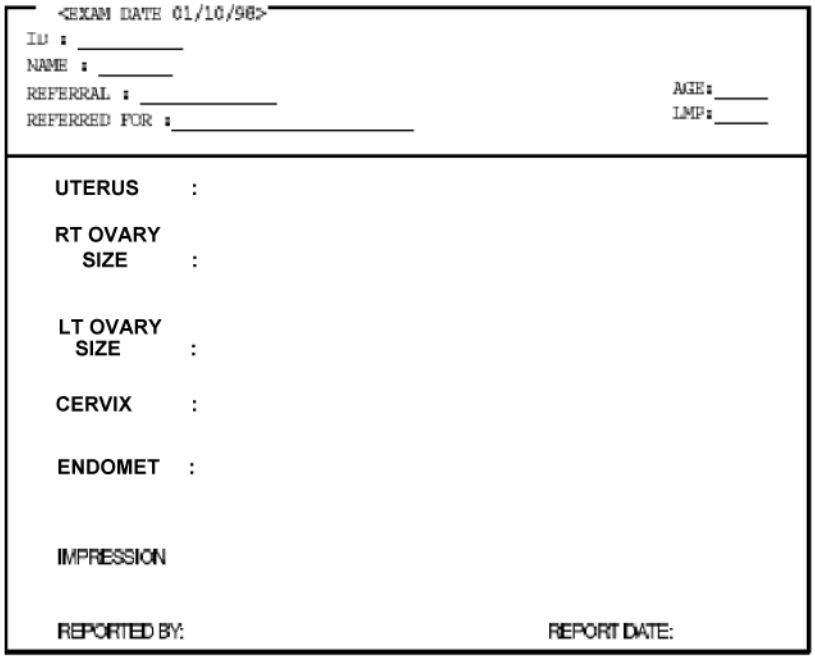


Figure 10-2. Gynecology Report Page

Gynecology IVF Report Page

To activate the Gynecology IVF Report Page:

Press the DR up/down key to move from the Gynecology Report page to the IVF Report page. The last measured follicle volumes are automatically transferred to the IVF Report page.

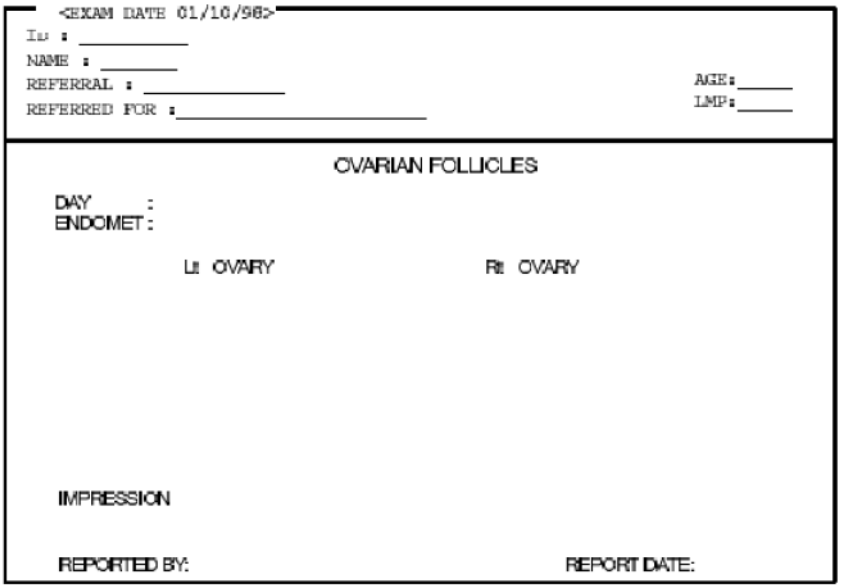


Figure 10-3. Gynecology IVF Report Page

Day: The field labled DAY indicates the age of the follicle. The maximum value is 20 days, For values more than 20 days the error is displayed. A maximum of 6 Follicle measurement can be made. It is calculated by the below formula.

Day = [Exam Date - LMP]

Recording Summary Reports

Press the Record key to print the report page on the video graphic printer when the report page is displayed on the screen.

CAUTION

LOGIQ 100 PRO does not provide report archive.

Ensure that the measurement report has been recorded prior to creating a new patient.

Chapter 11

Cardiology

Describes how to perform cardiac measurements and calculations.

Cardiology Exam Preparation

Introduction

Measurements and calculations derived from ultrasound images are intended to supplement other clinical procedures available to the attending physician. The accuracy of measurements is not only determined by the system accuracy, but also by use of proper medical protocols by the user. When appropriate, be sure to note any protocols associated with a particular measurement or calculation. Formulas and databases used within the system software that are associated with specific investigators are so noted. Be sure to refer to the original article describing the investigator's recommended clinical procedures.

Calculation formulas are available in the Measurement Formula chapter of advanced reference manual.

General Guidelines

New Patient information must be entered before beginning an exam. See ‘Beginning an Exam’ on *page 4-2 for more information.*

Any measurement can be repeated by selecting that measurement again from the Control Menu.

After pressing the Measure key, the measurement screen appears on the screen. Press the appropriate numeric key to perform the respective measurements. Press Numeric Key “0” to display the next available abdominal measurements.

Cardiology Measurements

Overview

The cardiac calculation for the LOGIQ 100 PRO offers limited cardiac measurement and calculation capabilities. Cardiology measurements offer two different types of measurement studies, Generic and Cardiac. On pressing Numeric Key 0, The measurements menu toggles between the cardiac and generic menus.

Figure 11-1. Cardiology Measurement Menu

Analysis of left ventricular measurement selections available are:

- Cubed method measurements
- Teicholz method measurements
- Bullet method measurements
- Simpson method measurements
- SP-ELD Formula measurements
- BP-ELD Formula measurements

NOTE: In B/M-Mode, the B-Mode measurements can be made only on the B-Mode area of the screen. Similarly, the M-Mode measurements can be made only on the M-Mode screen area. The M-Mode measurements cannot be performed in a B or B/B screen area and vice versa.

Auto Sequence Measurement

Cardiac measurements can be performed through an automatic sequence feature. Once the measurement begins, the system continues to calculate all the calculation items in the menu before the Clear key is pressed.

Press **Clear** twice if it is desired to disable the system's cardiac auto-measurement sequence and calculate item by item.

CUBED/TEICH Formula Measurements

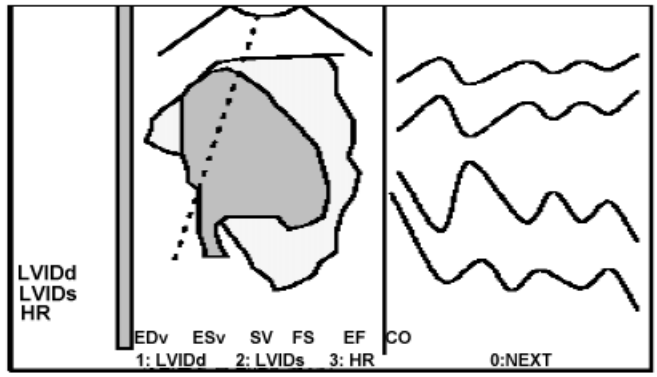


Figure 11-2. Cubed/Teich Measurement Menu

Cubed/Teichholz methods aupport the following left ventricle function measurements:

- LVIDd: Left ventricular internal diameter, diastole
- LVIDs: Left ventricular internal diameter, systole
- HR: Heart Rate

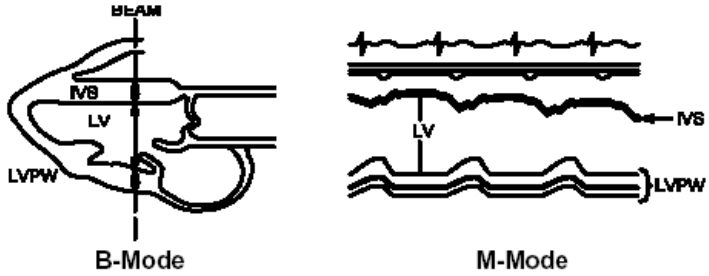


Figure 11-3. LV Measurement Analysis

BULLET Formula Measurements

1: LVLd 2: LVAMd 3: LVLs 4: LVAMs 0:NEXT

Figure 11-4. Bullet/SP-ELD Measurement Menu

The Bullet Method supports the following left ventricle function measurements:

- LVLd: Left ventricular Length, diastole
- LVAMd: Left ventricle area mitral valve, diastole
- LVLs: Left ventricular Length, systole
- LVAMs: Left ventricle area mitral valve, systole
- HR: Heart Rate

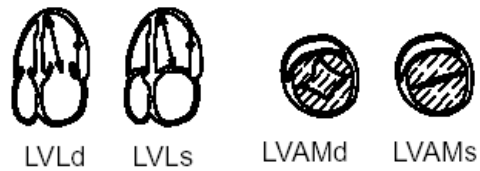


Figure 11-5. Bullet LV Measurements

Simpson Formula Measurements

1: LVLd 2: LVAMd 3: LVAPd 4: LVLs 5:LVAMs 6:LVAPs 0:NEXT

Figure 11-6. Simpson Measurements Menu

The Simpson Method supports the following left ventricle function measurements:

- LVLd: Left ventricular Length, diastole
- LVAMd: Left ventricular area, diastole
- LVAPd: Left ventricular area papillary muscles, diastole
- LVLs: Left ventricular Length, systole
- LVAMs: Left ventricular area, systole
- LVAPs: Left ventricular area papillary muscles, systole
- HR: Heart Rate

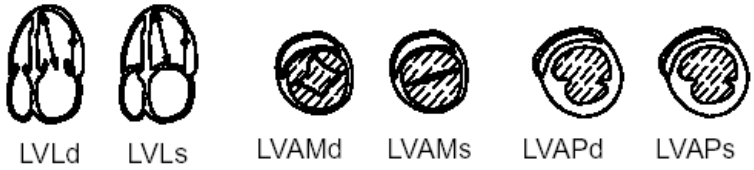


Figure 11-7. Simpson Method LV Measurements

Single Plane Ellipsoid Formula Measurements

1: LVLd 2: LVAd 3: LVLs 4:LVAd 0:NEXT

Figure 11-8. SP-ELD Measurement Menu

Single Plane Ellipsoid Method supports the following left ventricle function measurements:

- LVLd: Left ventricular Length, diastole
- LVAd: Left ventricular area, diastole
- LVLs: Left ventricular Length, systole
- LVAs: Left ventricular area, systole
- HR: Heart Rate

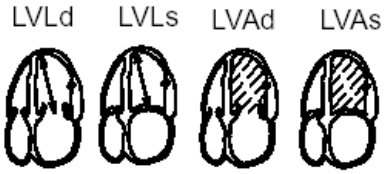


Figure 11-9. SP-ELD LV Measurements

Bi Plane Ellipsoid Formula Measurements

Figure 11-10. Bi Plane Ellipsoid Measurement Menu

BP-ELD Method supports following Left ventricle function measurements:

- LVMLd: Left ventricular medial-lateral dimension, diastole
- LVAMd: Left ventricular area mitral valve, diastole
- LVAd: Left ventricular area, diastole
- LVMLs: Left ventricular medial-lateral dimension, systole
- LVAMs: Left ventricular area mitral valve, systole
- LVAs: Left ventricular area, systole
- HR: Heart Rate

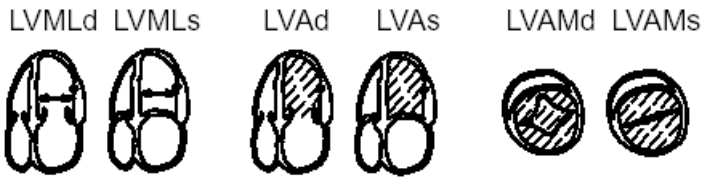


Figure 11-11. BP-ELD Method LV Measurements

Cardiac Calculations

Based on the left ventricle function measurements (Cubed/ Teichholz/Bullet/Simpson/SP-ELD/BP-ELD), the following are calculated and display on measurement summary window:

1. End Diastolic Volume (EDV): The EDV is the volume of the LV at the end of diastole. It corresponds to the PR value in ECG.
2. End Systolic Volume (ESV): The ESV is the volume of the LV at the end of systole. It correspondes to the Twave in ECG.
3. Stroke Volume (SV): Stroke volume is the volume of blood pumped by the heart in a single beat. It is equal to the difference between the LV End Diastollic and End Systolic Volume and is expressed in milliliters.
4. Cardiac Output (CO): Cardiac Output is the volume of blood pumped by the heart in one minute. It is equivalent to stroke volume times heart rate. It is expressed in liters per minute.
5. Ejection Fraction (EF): Ejection fraction is the fraction of blood effectively pumped out of the heart in one beat. It is equal to the stroke volume divided by end diastolic volume. It is expressed as a percentage.

NOTE: Measurement formulas are available in advanced reference manual.

Cardiology Report Page

On pressing “Control R” key, the system displays cardiology report when it is in Cardiac exam category.The last performed calculations are automatically incorporated in the report page.

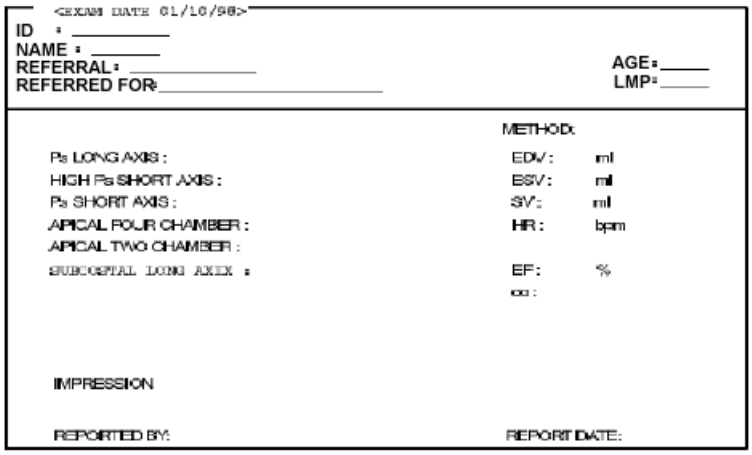


Figure 11-12. Cardiology Report Page (Cubed)

Recording Summary Reports

Press the Record key to print the Cardiology report page on the video graphic printer when the report page is displayed on the screen.

CAUTION

LOGIQ 100 PRO does not provides report archive.

Ensure that the measurement report has been recorded prior to creating a new patient.

Chapter 12

Urology

Describes how to perform Urology measurements and calculations.

Urology Exam Preparation

Introduction

Measurements and calculations derived from ultrasound images are intended to supplement other clinical procedures available to the attending physician. The accuracy of measurements is not only determined by the system accuracy, but also by use of proper medical protocols by the user. When appropriate, be sure to note any protocols associated with a particular measurement or calculation. Formulas and databases used within the system software that are associated with specific investigators are so noted. Be sure to refer to the original article describing the investigator's recommended clinical procedures.

Calculation formulas are available in the Measurement Formulas chapter of advance reference manual.

General Guidelines

New Patient information must be entered before beginning an exam. See ‘Beginning an Exam’ on *page 4-2 for more information.*

Any measurement can be repeated by selecting that measurement again from the control menu.

After pressing the Measure key, the measurement screen appears on the screen. Press the appropriate numeric key to perform the respective measurements. Press numeric key “0” to display the next available urology measurements.

Urology Measurements

The following measurements are available for the Urology exam category.

- Obstetrics Measurements
- Generic Measurements

Obstetrics Measurements

Refer the obstetrics chapter for more information on doing obstetrics measurements.

Generic Measurements

On selecting NEXT (numeric “0” key) on the measurement menu displays generic measurements. Select the appropriate numeric key to perform the respective measurement.

C&A(Area) Measurement

See ‘Area Measurement’ on *page 7-13 for more information.*

VLM(Volume) Measurement

See ‘Volume Measurement’ on *page 7-14 for more information.*

A/B (Ratio) Measurement

See ‘A/B Ratio’ on *page 7-15 for more information.*

Heart Rate Measurement

See ‘Heart Rate’ on *page 7-17 for more information.*

Veocity Measurement

See ‘Velocity Measurement’ on *page 7-18 for more information.*

Time Measurement

See ‘Time Interval Measurement’ on *page 7-11 for more information.*

Urology Report Page

Pressing “Control R” displays the urology report page while in the urology exam category.The last three performed measurements are automatically transferred to the report pages.The patient details, entered during new patient registeration, gets transferred to the report pages. The Report page provides a data entry to enter comments regarding the patient diagnostics.

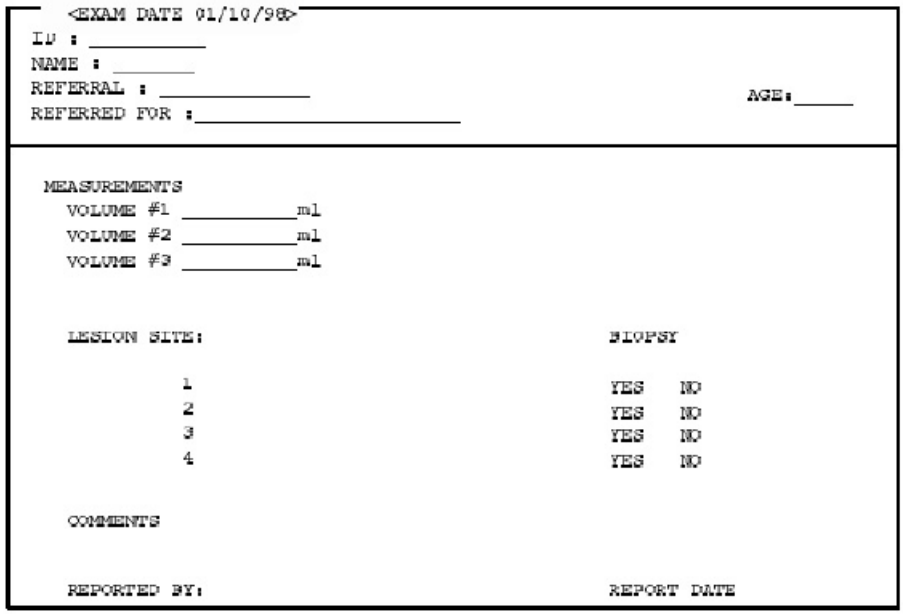


Figure 12-1. Urology Report Page

Patient Information

Patient ID

The ID, generated automatically during the registration of a new patient, is automatically transferred to the report page.

Patient Name

The Name, entered as part of patient registration, is automatically transferred to the report pages.

Patient Age

The patient Age, Enter patient age.

Referral

The referring physician, Enter the name of the referring physician (up to 16 characters).

Referred For

A Referred For field is available on the report page for entering the reason for the referral (up to 30 characters).

Measurement Information

Volume#1

The third last measured volume measurement is displayed on the respective field of the urology report page.

Volume#2

The second last measured volume measurement is displayed on the respective field of the urology report page.

Volume#3

The last measured volume measurement is displayed on the respective field of the urology report page.

Reporting Section Information

Comments

Three lines of comments can be entered on the report page.

Reported By

A Reported By field is available on the report page for entering the person reporting the information

Reporting Date

The current system date is automatically transferred to the report page.

Recording Summary Reports

Press the Record key to print the urology report page on the video graphic printer when the report page is displayed on the screen.

CAUTION

LOGIQ 100 PRO does not provide report archive.

Ensure that the measurement report has been recorded prior to creating a new patient.

Chapter 13

Customizing the system

Describes how to create system, user, and exam presets from/to LOGIQ 100 PRO system.

Help for Control and Direct Keys

The CONTROL H function enables a Help screen for Control and Direct keys. When the Help screen is enabled, the image display is temporarily not visible, along with measurements, comments and body patterns.

Pressing CLEAR removes the Help screen from the display while restoring all image display, measurements, comments and body patterns. Press CLEAR again to exit the Control mode.

HELP MENU FOR CONTROL & DIRECT KEYS
CTRL-An: FRAME AVERAGING(0:OFF 1:25% 2:50% 3:75%)
CTRL-B : BIOPSY ZONE DISPLAY ON/OFF
CTRL-C : HOME POSITON FOR COMMENT
CTRL-Dn: APPL. (1:ABD 2:OB 3:GYN 4:CD 5:URO 6:SP 7:USR)
CTRL-En: CLEAR USER OB TABLE (1-5)
CTRL-F : FACTORY DEFAULT SETTINGS FOR CURRENT PROBE
CTRL-Gn: ENTER/EDIT USER OB TABLE(1-5)
CTRL-H : HELP FOR CONTROL & DIRECT KEYS
CTRL-In: EDGE ENHANCEMENT (0:OFF 1:LOW 2:MEDIUM 3:HIGH)
CTRL-Kn: IMAGE SOFTENER (0: OFF 1: ON)
CTRL-Mn: MULTI FREQUENCY (0: 3.5MHz 1: 5.0MHz)
CTRL-N : BIOPSY ZONE CHANGE
CTRL-On: ATO MODE (1:AUTO 2:MANUAL)
CTRL-R : REPORT DISPLAY
CTRL-Sn: SETUP MENU (1:INSTALLATION 2:EUROPEAN OB TABLE)
CTRL-J : PRINTER EJECT PAGE
CTRL-W : PROBE PARAMETER PRESET
CTRL-Yn: MAP CURVE SEL (1-5) IN PKG A/B
R : SAME AS CTRL-R B : SAME AS CTRL-B
H : SAME AS CTRL-H N : SAME AS CTRL-N
SHIFT-REVERSE: IMAGE INVERT
SHIFT-RECORD : REPORT/IMAGE PRINT ON PARALLEL PRINTER
SHIFT-STORE : IMAGE TRANSFER TO PC
DYN. RANGE-UP : NEXT PAGE
DYN. RANGE-DOWN : PREV PAGE

Figure 13-1. Help Preset Menu

System Configuration

Overview

The CONTROL S function accesses the system setup for the installation setup window or the european OB Table Setup window. When this function is enabled, the image, measurements, body patterns and comments (if any) are temporarily not visible on the screen.

Follow the below sequence to display setup menu:

- Press “CONTROL S”.
- Select any of the following options:
  - 1 for System Presets Menu.
  - 2 for European OB Table menu.
- Press “CONTROL” key to activate appropriate menu.

System Presets Menu

System presets allows you to view or change the following parameters

- Hospital Name
- Date Format
- Date
- Time
- OB Version Selected
- Film Exposure Time
- Minimum Film Exposure Interval
- Video Invert For Report Print
- Circumference Measurement Method
- US GA Selection
- Add 1 week to EDD
- Language Selection
- Hip Orientation

System Presets Menu (continued)

Changing System Parameters

To change system parameters:

1. Select values for the parameters to be changed.
2. To save the changes, press the “Set”. Press “Clear” to exit from presets screen.

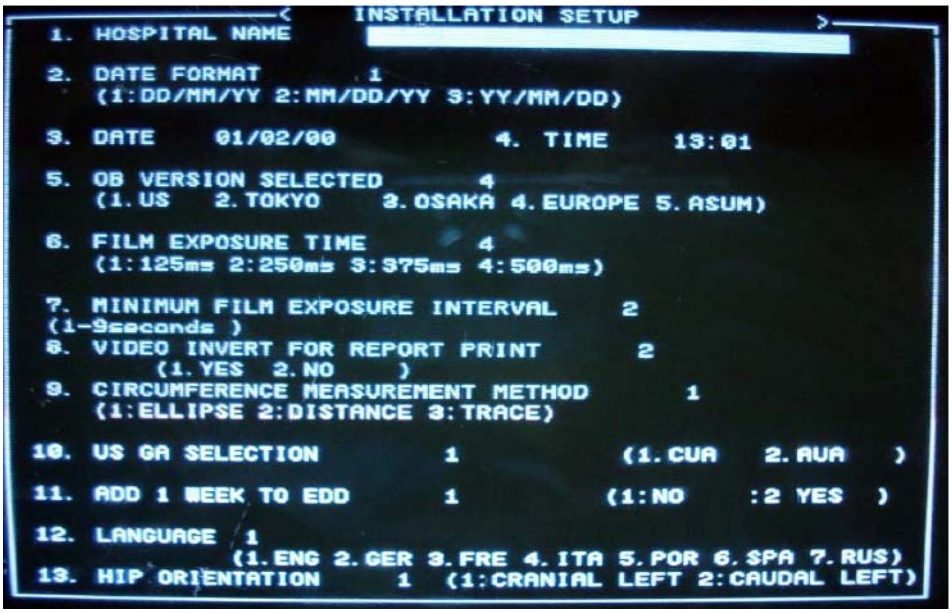

INSTALLATION SETUP
1. HOSPITAL NAME
2. DATE FORMAT 1
(1:DD/MM/YY 2:MM/DD/YY 3:YY/MM/DD)
3. DATE 01/02/00
4. TIME 13:01
5. OB VERSION SELECTED 4
(1.US 2.TOKYO 3.OSAKA 4.EUROPE 5.ASUM)
6. FILM EXPOSURE TIME 4
(1:125ms 2:250ms 3:375ms 4:500ms)
7. MINIMUM FILM EXPOSURE INTERVAL 2
(1-9seconds)
8. VIDEO INVERT FOR REPORT PRINT 2
(1.YES 2.NO)
9. CIRCUMFERENCE MEASUREMENT METHOD 1
(1:ELLIPSE 2:DISTANCE 3:TRACE)
10. US GA SELECTION 1 (1.CUA 2.AUA)
11. ADD 1 WEEK TO EDD 1 (1:NO :2 YES)
12. LANGUAGE 1
(1.ENG 2.GER 3.FRE 4.ITA 5.POR 6.SPA 7.RUS)
13. HIP ORIENTATION 1 (1:CRANIAL LEFT 2:CAUDAL LEFT)

Figure 13-2. System Preset Screen

System Presets Menu (continued)

Customizing Preset parameters

Table 13-1: Preset Parameters

Preset Name	Description	Default
Hospital Name	Enter your own hospital name orinstitution name.	GE Medical Systems
Date Format	Select the appropriate dateformat.	DD/MM/YYYY
Date	Enter the Date to set for thesystem	
Time	Enter the time to display on thesystem	
OB Version Selection	Select the appropriate OBVersion.	US
FILM Exposure Time	Select the appropriate FilmExposure Time.	500ms
Minimum Film Exposure Time Interval	Select the appropriate FilmExposure Time interval.	2 seconds
Video Invert for Report Print	Select the appropriate Videoinvert for Report Print.	No
Circumference Measurement Method	Select the appropriatecircumference MeasurementMethod.	Ellipse
US GA Selection	Select the appropriate GAselection	CUA
Add one week to EDD	Select the appropriate value	No
Language Selection	Select the User Interfacelanguage. ENG: English GER:German FRE: French ITA: Italian POL: Polish SPA: Spanish RUS: Russian	ENG: English

Europe OB Table Author Presets

European OB Table presets allows you to view or change the author for measurements.

Use the TRACKBALL or SHIFT arrow keys to move from up/down, or left/right to edit the fields. Use BACK SPACE to delete a character to the left of the cursor.

Press “Set” key to save the settings. Press “Clear” key to exit from Europe OB Table Presets menu.

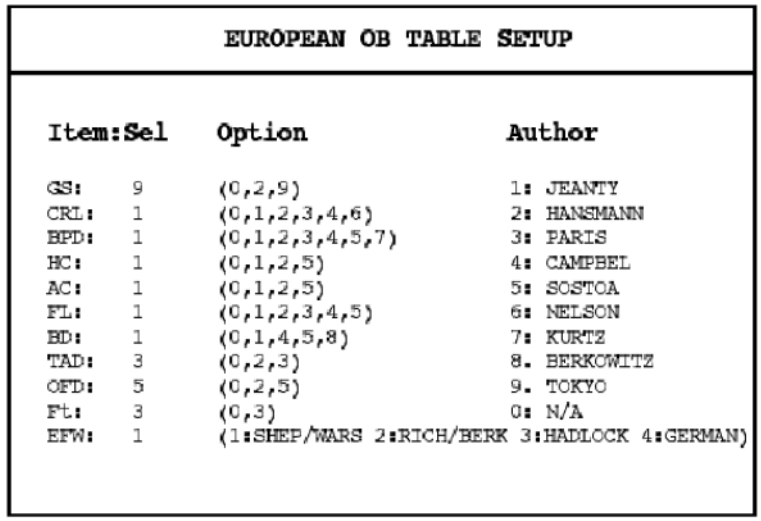

EUROPEAN OB TABLE SETUP
Item:Sel Option Author
GS: 9 (0,2,9) 1: JEANTY
CRL: 1 (0,1,2,3,4,6) 2: HANSMANN
BPD: 1 (0,1,2,3,4,5,7) 3: PARIS
HC: 1 (0,1,2,5) 4: CAMPBEL
AC: 1 (0,1,2,5) 5: SOSTOA
FL: 1 (0,1,2,3,4,5) 6: NELSON
BD: 1 (0,1,4,5,8) 7: KURTZ
TAD: 3 (0,2,3) 8. BERKOWITZ
OFD: 5 (0,2,5) 9. TOKYO
Ft: 3 (0,3) 0: N/A
EFW: 1 (1:SHEP/WARS 2:RICH/BERK 3:HADLOCK 4:GERMAN)

Figure 13-3. Europe Author Presets Screen

Europe OB Table Author Presets (continued)

Changing System Parameters

To change system parameters:

1. Select values for the parameters to be changed.
2. To save the changes, press the “Set”. Press “Clear” to exit from Europe author preset screen.

Customizing Preset parameters

Table 13-2: Europe Table Author Preset Parameters

Measurement Name	Description	Default
GS	Select the appropriate author for GS	Tokyo
CRL	Select the appropriate author for CRL	Jeanty
BPD	Select the appropriate author for BPD	Jeanty
HC	Select the appropriate author for HC	Jeanty
AC	Select the appropriate author for AC	Jeanty
FL	Select the appropriate author for FL	Jeanty
BD	Select the appropriate author for BD	Jeanty
TAD	Select the appropriate author for TAD	Paris
OFD	Select the appropriate author for OFD	Sasota
Ft	Select the appropriate author for Ft	Paris
EFW	Select the appropriate author for EFW	SHEP/WARS

Imaging Presets

Overview

Imaging presets lets you to optimize the image quality. There are two kinds imaging presets available:

- Factory Default Settings: Factory presets allows you to specify parameters for probe connected and reloads when ever you need.
- Customization of Imaging Presets: Customize your own imaging presets to optimize image quality of the system.

Factory Default Presets

Use the CONTROL F function to revert to the Factory Default settings which are preset at the time of shipment for the current probe.

Factory Default settings are as follows,

Probe C36

Table 13-3: C36 Factory Presets

Diag. Categ	Depth (mm)	Gain (dB)	Focus (mm)	DR (dB)	CONT map	IR	II	FA
Abdomen	150	54	Combi	66	4	Left	Up	50%
OB	150	54	Combi	66	4	Left	Up	50%
Gyn	150	54	Combi	66	4	Left	Up	50%
Card	150	54	Combi	66	4	Left	Up	50%
Urology	150	54	Combi	66	3	Left	Up	50%
Small Parts	150	54	Combi	66	4	Left	Up	50%
User Defined	150	54	Combi	66	4	Left	Up	50%

Default Category for C36 is abdomen.

Probe C55

Table 13-4: C55 Factory Presets

Diag. Categ	Depth (mm)	Gain (dB)	Focus (mm)	DR (dB)	CONT map	IR	II	FA
Abdomen	150	54	Combi	66	4	Left	Up	50%
OB	150	54	Combi	66	4	Left	Up	50%
Gyn	150	54	Combi	66	4	Left	Up	50%
Card	150	54	Combi	54	4	Left	Up	50%
Urology	150	54	Combi	54	3	Left	Up	50%
Small Parts	100	54	Combi	54	4	Left	Up	50%
User Defined	150	50	Combi	66	3	Left	Up	50%

Default Category for C55 is abdomen.

Probe C31

Table 13-5: C31 Factory Presets

Diag. Categ	Depth (mm)	Gain (dB)	Focus (mm)	DR (dB)	CONT map	IR	II	FA
Abdomen	150	54	Combi	66	4	Left	Up	50%
OB	150	54	Combi	54	3	Left	Up	50%
Gyn	150	54	Combi	66	4	Left	Up	50%
Card	150	60	Combi	48	4	Left	Up	50%
Urology	150	54	Combi	66	3	Left	Up	50%
Small Parts	150	54	Combi	66	4	Left	Up	50%
User Defined	150	54	Combi	66	4	Left	Up	50%

Default Category for C31 is cardiology.

Probe E72

Table 13-6: E72 Factory Presets

Diag. Categ	Depth (mm)	Gain (dB)	Focus (mm)	DR (dB)	CONT map	IR	II	FA
Abdomen	100	54	Combi	66	4	Left	Up	50%
OB	100	54	Combi	66	4	Left	Up	50%
Gyn	100	54	Combi	66	4	Left	Up	50%
Card	100	54	Combi	66	4	Left	Up	50%
Urology	100	54	Combi	66	4	Left	Up	50%
Small Parts	100	54	Combi	54	4	Left	Up	50%
User Defined	100	54	Combi	66	4	Left	Up	50%

Default Category for E72 is gynecology.

Probe L76

Table 13-7: L76 Factory Presets

Diag. Categ	Depth (mm)	Gain (dB)	Focus (mm)	DR (dB)	CONT map	IR	II	FA
Abdomen	100	50	Combi	72	4	Left	Up	50%
OB	100	50	Combi	72	4	Left	Up	50%
Gyn	100	50	Combi	72	4	Left	Up	50%
Card	100	50	Combi	72	4	Left	Up	50%
Urology	100	50	Combi	72	4	Left	Up	50%
Small Parts	100	50	Combi	72	4	Left	Up	50%
User Defined	100	50	Combi	72	4	Left	Up	50%

Default Category for L76 is small parts.

Probe CZB

Table 13-8: CZB Factory Presets

Diag. Categ	Depth (mm)	Gain (dB)	Focus (mm)	DR (dB)	CONT map	IR	II	FA
Abdomen	100	54	Combi	66	4	Left	Up	50%
OB	100	54	Combi	66	4	Left	Up	50%
Gyn	100	54	Combi	66	4	Left	Up	50%
Card	100	54	Combi	66	4	Left	Up	50%
Urology	100	54	Combi	66	3	Left	Up	50%
Small Parts	100	54	Combi	66	4	Left	Up	50%
User Defined	100	54	Combi	66	4	Left	Up	50%

Default Category for CZB is small parts.

Probe LB

Table 13-9: LB Factory Presets

Diag. Categ	Depth (mm)	Gain (dB)	Focus (mm)	DR (dB)	CONT map	IR	II	FA
Abdomen	150	54	Combi	72	4	Left	Up	50%
OB	150	50	Combi	72	4	Left	Up	50%
Gyn	150	54	Combi	72	4	Left	Up	50%
Card	150	54	Combi	72	4	Left	Up	50%
Urology	150	54	Combi	72	3	Left	Up	50%
Small Parts	150	54	Combi	72	4	Left	Up	50%
User Defined	150	54	Combi	72	4	Left	Up	50%

Default Category for LB is abdomen.

Customizing Imaging Parameters

To change imaging parameters:

1. Press “CONTROL W”.
2. Change any of the folllowing parameters.
   - Gain
   - Dynamic Range
   - Focus
   - Image direction (Left/Right, Top/Bottom)
   - Depth
   - Gray Scale Map Curve
   - Frame Average
3. To save and exit the changes, select the “Set” key. Select Clear to return to scanning.

The system reverts to these preset values upon pressing PRESET key, probe change, or power is turned on.

NOTE: If a mistake is made while presetting, revert back to factory default settings of that diagnostic category by pressing CONTROL F.

Gray Scale Map Curve

The system has ten types of curves (in two groups A and B) that translate an image from system memory into a gray scale display.

The CONTROL Y function selects the gray level mapping curve for a Diagnostic Category or the Category under study.

The OB Diagnostic Category uses package B. All the other Diagnostic Categories use package A.

To assign a map curve to an image (frozen or real time):

- Press “CONTROL Y”.
- Select the map curve to assign.
  - 1 for Mapping level 1
  - 2 for Mapping level 2
  - 3 for Mapping level 3
  - 4 for Mapping level 4
  - 5 for Mapping level 5
- Press ENTER to save the map curve for the respective category.

Gray Scale Map Curve (continued)

Gray Scale Maps

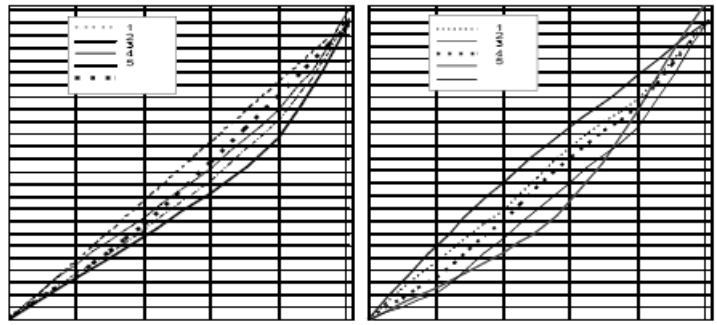


Figure 13-4. Gray Scale Map Curves

1. B Packeage graphs (1-5 options)- OB Category
1. A Packeage graphs (1-5 options)- Other than OB category

- Option 1: The picture is transformed into a line on a gray scale. This curve does not enhance imagestructure.
- Option 2: The echo brightness in higher band is increased. The image becomes softer and the surrounding tissues are amplified (ideal for diagnosing soft tissue).
- Option 3: The echo brightness in higher band is further increased. The image becomes softer and the surrounding tissues are amplified (ideal for diagnosing soft tissue).
- Option 4: The echo brightness in medium band is increased and shows higher contrast. The image will become clearer (used for diagnosing structures with cavities).
- Option 5: The echo brightness in medium band is further increased and shows higher contrast.

Chapter 14

Probes and Biopsy

This chapter consists of the information of each probe and describes some special concerns, biopsy kits and accessories as well as basic procedures for attaching a biopsy guide to the different types of probes.

Probe Overview

Ergonomics

Probes have been ergonomically designed to:

- Handle and manipulate with ease
- Connect to the system with one hand
- Be lightweight and balanced
- Have rounded edges and smooth surfaces
- Stand up to typical wear by cleaning and disinfectant agents, contact with approved gel, etc.

Cables have been designed to:

- Connect to system with appropriate cable length

Cable handling

Take the following precautions with probe cables:

- Keep free from wheels
- Do not bend the cable acutely
- Avoid crossing cables between probes.

Probe orientation

Each probe is provided with an orientation marking (refer to Figure 14-1). This mark is used to identify the end of the probe corresponding to the side of the image having the orientation mark on the display.

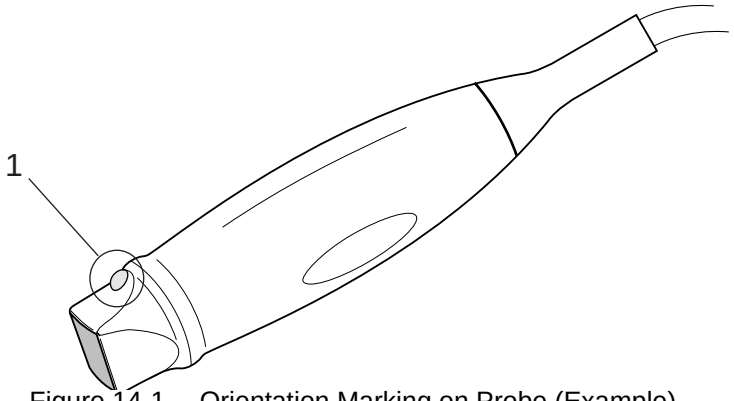


Figure 14-1. Orientation Marking on Probe (Example)

1. Orientation Mark

Labeling

Each probe is labeled with the following information:

- Seller's name and manufacturer
- Operating frequency (not shown on all probes)
- GE part number
- Probe serial number
- Month and year of manufacture
- Probe designation-provided on the probe grip and the top of the connector housing, so it is easily read when mounted on the system and is also automatically displayed on the screen when the probe is selected.

Labeling (continued)

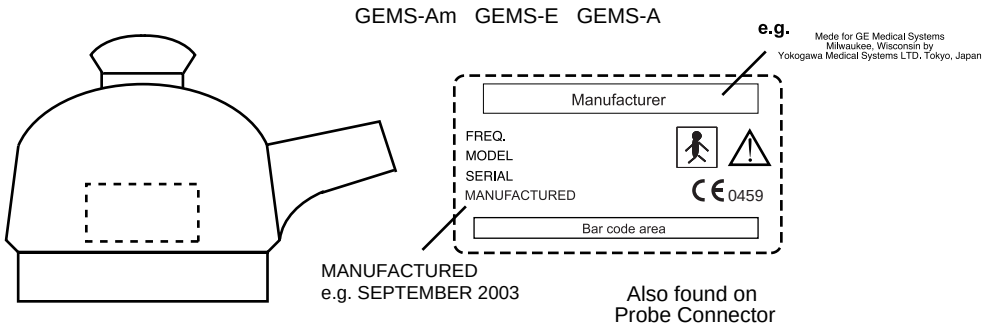


Figure 14-2. Probe Adapter Label

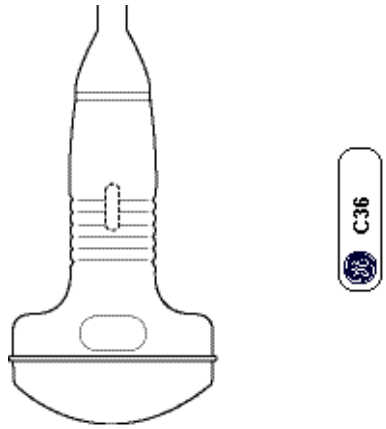


Figure 14-3. Probe Handle Labels

Labeling (continued)

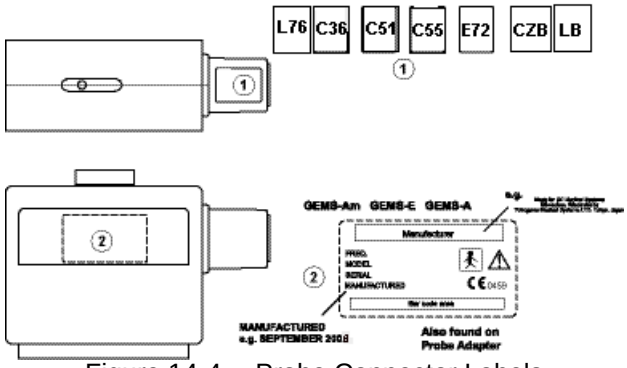


Figure 14-4. Probe Connector Labels

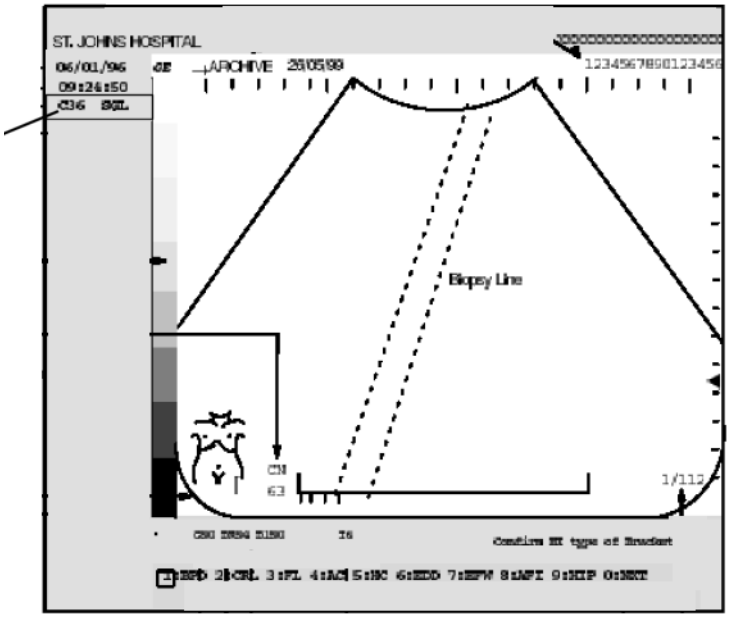


Figure 14-5. Displayed Probe Information

LOGIQ 100 PRO Applications

Always select a probe that provides optimum focal depth and penetration for patient size and application. Proper orientation of the probes produce best results.

- The Linear probe (L76) is a high frequency probe used for imaging small parts and superficialstructures.
- The Convex probe (C36, C55, C31) is used for OB/GYN, abdomen and cardiology scans.
- The Micro Convex probe (E72) is the intracavitary probe used for early pregnancy, follicular studies and urology applications.
- The Convex Probe(CZB) is used for Neonatal,Small Part scans
- The Linear Probe (LB) is used for OB/GYN and Superfical Parts Scans

Specifications

Table 14-1: System Probe Definitions

Probe	Frequency	Radius	FoV
C36	3.5,5	50mm	68mm
C31	5	13.1mm	85mm
C55	5	40mm	68mm
L76	7.5	-	60mm
E72	6.5	10mm	114mm
CZB	6.5	10mm	124mm
LB	3.5	-	91mm1

Probe Usage

For details on connecting, activating, deactivating, disconnecting, transporting and storing the probes, See ‘Probe Connection’ on page 3-14 for more information.

Care and Maintenance

Inspecting probes

Perform After Each Use

Inspect the probe's lens, cable, casing, and connector. Look for any damage that would allow liquid to enter the probe. If any damage is found, do not use the probe until it has been inspected and repaired/replaced by a GE Service Representative.

NOTE: *Keep a log of all probe maintenance, along with a picture of any probe malfunction.*

Environmental Requirements

Probes should be operated, stored, or transported within the parameters outlined below.

CAUTION

Ensure that the probe face temperature does not exceed the normal operation temperature range.

Table 14-2: Probe Environmental Requirements

	Operational	Storage	Transport
Temperature	10° C to 40° C 50° F to 104° F	-10° C to 60° C 14° F to 140° F	-40° C to 60° C -40° F to 140° F
Humidity	30 to 85%RH non-condensing	30 to 85%RH non-condensing	30 to 85%RH non-condensing
Pressure	700 to 1060hPa	700 to 1060hPa	700 to 1060hPa

Probe Safety

Handling precautions

Ultrasound probes are highly sensitive medical instruments that can easily be damaged by improper handling. Use care when handling and protect from damage when not in use. DO NOT use a damaged or defective probe. Failure to follow these precautions can result in serious injury and equipment damage.

Electrical shock hazard

The probe is driven with electrical energy that can injure the patient or user if live internal parts are contacted by conductive solution:

- **DO NOT** immerse the probe into any liquid beyond the level indicated by the immersion level diagram. Refer to Figure 14-6. Never immerse the probe connector or probe adaptors into any liquid.
- **DO NOT** drop the probes or subject them to other types of mechanical shock or impact. Degraded performance or damage such as cracks or chips in the housing may result.
- Prior to each use, visually inspect the probe lens and case area for cracks, cuts, tears, and other signs of physical damage. DO NOT use a probe which appears to be damaged until you verfify functional and safe performance. You must perform a more thorough inspection, including the cable, strain relief, and connector, each time you clean the probe.
- Before inserting the connector into the probe port, inspect the probe connector pins. If a pin is bent, do not use the probe until it has been inspected and repaired/replaced by a GE Service Representative.
- **DO NOT** kink, tightly coil, or apply excessive force on the probe cable. Insulation failure may result.
- Electrical leakage checks should be performed on a routine basis by GE Service or qualified hospital personnel. Refer to the service manual for leakage check procedures.

Mechanical hazards

CAUTION

A defective probe or excessive force can cause patient injury or probe damage:

- Do not apply excessive force when inserting or manipulating intercavitary probes.
- Inspect probes for sharp edges or rough surfaces that could injure sensitive tissue.
- DO NOT apply excessive force to the probe connector when inserting into the probe port. The pin of a probe connector may bend.
- Possible injury may result. The user must exercise caution and use additional care while introducting and manupulating invasive or intracavitary probes, especially for examination of smaller anatomies.

Special handling instructions

Using protective sheaths

CAUTION

Protective barriers may be required to minimize disease transmission. Probe sheaths are available for use with all clinical situations where infection is a concern. Use of legally marketed, sterile probe sheaths is strongly recommended for intra-cavitary and intra-operative procedures. Use of legally marketed, sterile, pyrogen free probe sheaths is REQUIRED for neurological intra-operative procedures.

Instructions: Custom made sheaths are available for each probe. Each probe sheath kit consists of a flexible sheath used to cover the probe and cable and elastic bands used to secure the sheath.

Sterile probe sheaths are supplied as part of biopsy kits for those probes intended for use in biopsy procedures. In addition to the sheath and elastic bands, there are associated accessories for performing a biopsy procedure which are included in the kit. Refer to the biopsy instructions for the specific probes in the Discussion section of this chapter for further information.

Reordering: To reorder sheaths, please contact your local distributor or the appropriate support resource.

CAUTION

Devices containing latex may cause severe allergic reaction in latex sensitive individuals. Refer to FDA's March 29, 1991 Medical Alert on latex products.

CAUTION

Do not use pre-lubricated condoms as a sheath. In some cases, they may damage the probe. Lubricants in these condoms may not be compatible with probe construction.

CAUTION

DO NOT use an expired probe sheath. Before using probe sheaths, verify whether the term of validity has expired.

Endocavitary Probe Handling Precautions

If the sterilization solution comes out of the endocavitary probe, please follow the cautions below.

CAUTION

Sterilant Exposure to Patient (e.g., Cidex)—Contact with a sterilant to the patient's skin or mucous membrane may cause an inflammation. If this happens, refer to the sterilant's instruction manual.

Sterilant Exposure from Probe Handle to Patient (e.g., Cidex)—DO NOT allow the sterilant to contact the patient. Only immerse the probe to its specified level. Ensure that no solution has entered the probe's handle before scanning the patient. If sterilant comes into contact with the patient, refer the the sterilant's instruction manual.

Sterilant Exposure from Probe Connector to Patient (e.g., Cidex)—DO NOT allow the sterilant to contact the patient. Only immerse the probe to its specified level. Ensure that no solution has entered the probe's connector before scanning the patient. If sterilant comes into contact with the patient, refer the the sterilant's instruction manual.

Endocavitary Probe Point of Contact—Refer to the sterilant's instruction manual.

Probe handling and infection control

This information is intended to increase user awareness of the risks of disease transmission associated with using this equipment and provide guidance in making decisions directly affecting the safety of the patient as well as the equipment user.

Diagnostic ultrasound systems utilize ultrasound energy that must be coupled to the patient by direct physical contact. Depending on the type of examination, this contact occurs with a variety of tissues ranging from intact skin in a routine exam to recirculating blood in a surgical procedure. The level of risk of infection varies greatly with the type of contact.

One of the most effective ways to prevent transmission between patients is with single use or disposable devices. However, ultrasound transducers are complex and expensive devices that must be reused between patients. It is very important, therefore, to minimize the risk of disease transmission by using barriers and through proper processing between patients.

Risk of Infection. ALWAYS clean and disinfect the probe between patients to the level appropriate for the type of examination and use FDA-cleared probe sheaths where appropriate. See Chapter 15 for ordering information.

Adequate cleaning and disinfection are necessary to prevent disease transmission. It is the responsibility of the equipment user to verify and maintain the effectiveness of the infection control procedures in use. Always use sterile, legally marketed probe sheaths for intra-cavitary and intra-operative procedures.

For neurological intra-operative procedures, use of a legally marketed, sterile, pyrogen free probe sheath is REQUIRED. Probes for neuro surgical use must not be sterilized with liquid chemical sterilants because of the possibility of neuro toxic residues remaining on the probe.

Probe Cleaning Process

Cleaning probes

Perform After Each Use

To clean the probe:

1. Disconnect the probe from the ultrasound console and remove all coupling gel from the probe by wiping with a soft cloth and rinsing with flowing water.
2. Wash the probe with mild soap in lukewarm water. Scrub the probe as needed using a soft sponge, gauze, or cloth to remove all visible residue from the probe surface. Prolonged soaking or scrubbing with a soft bristle brush (such as a toothbrush) may be necessary if material has dried onto the probe surface.
3. Rinse the probe with enough clean potable water to remove all visible soap residue.
4. Air dry or dry with a soft cloth.

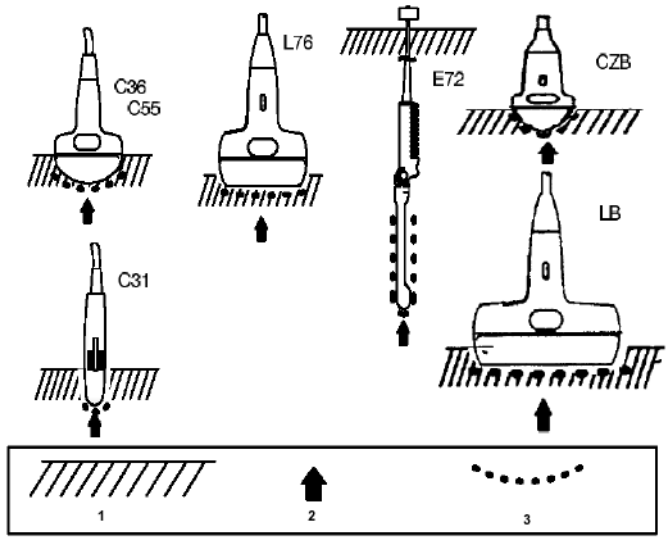


Figure 14-6. Probe Immersion Levels

1. Fluid Level
2. Aperature
3. Contact face within Patient Environment

Disinfecting probes

Perform After Each Use

Ultrasound probes can be disinfected using liquid chemical germicides. The level of disinfection is directly related to the duration of contact with the germicide. Increased contact time produces a higher level of disinfection.

The following high level disinfectant agents have been approved for use with all probes:

- Cidex OPA
- Cidex

CAUTION

In order for liquid chemical germicides to be effective, all visible residue must be removed during the cleaning process. Thoroughly clean the probe, as described earlier before attempting disinfection.

You MUST disconnect the probe from the LOGIQ 100 PRO prior to cleaning/disinfecting the probe. Failure to do so could damage the system.

DO NOT soak probes in liquid chemical germicide for longer than is stated by the germicide instructions for use. Extended soaking may cause probe damage and early failure of the enclosure, resulting in possible electric shock hazard.

Disinfecting probes (continued)

1. Prepare the germicide solution according to the manufacturer's instructions. Be sure to follow all precautions for storage, use and disposal.
2. Place the cleaned and dried probe in contact with the germicide for the time specified by the germicide manufacturer. High-level disinfection is recommended for surface probes and is required for endocavitary and intraoperative probes (follow the germicide manufacturer's recommended time).

CAUTION

Probes for neuro surgical intra-operative use must NOT be sterilized with liquid chemical sterilants because of the possibility of neuro toxic residues remaining on the probe. Neurological procedures must be done with the use of legally marketed, sterile, pyrogen free probe sheaths.

3. After removing from the germicide, rinse the probe following the germicide manufacturer's rinsing instructions. Flush all visible germicide residue from the probe and allow to air dry.

CAUTION

CREUTZFIELD-JACOB DISEASE

Failure of the probe sheath or direct contact of the probe with dura or any intra-cranial tissue of patients with Creutzfield-Jakob disease requires that the probe be destroyed. There is no effective means for decontamination of the probe. For more information, see the Center of Disease Control and Prevention http://www.cdc.gov/ncidod/hip/sterile/cjd.htm.

Biological Hazard

Disinfecting probes (continued)

Ultrasound transducers can easily be damaged by improper handling and by contact with certain chemicals. Failure to follow these precautions can result in serious injury and equipment damage.

- Do not immerse the probe into any liquid beyond the level specified for that probe. Never immerse the transducer connector or probe adapters into any liquid.
- Avoid mechanical shock or impact to the transducer and do not apply excessive bending or pulling force to the cable.
- Transducer damage can result from contact with inappropriate coupling or cleaning agents:
  - Do not soak or saturate transducers with solutions containing alcohol, bleach, ammonium chloride compounds or hydrogen peroxide
  - Avoid contact with solutions or coupling gels containing mineral oil or lanolin
  - Avoid temperatures above 60°C.
- Inspect the probe prior to use for damage or degeneration to the housing, strain relief, lens and seal. Do not use a damaged or defective probe.

Coupling gels

Do not use unrecommended gels (lubricants). They may damage the probe and void the warranty.

Applying

In order to assure optimal transmission of energy between the patient and probe, a conductive gel or couplant must be applied liberally to the patient where scanning will be performed.

Do not apply gel to the eyes. If there is gel contact to the eye, flush eye thoroughly with water.

Precautions

Coupling gels should not contain the following ingredients as they are known to cause probe damage:

- Methanol, ethanol, isopropanol, or any other alcohol-based product
- Mineral oil
- Iodine
- Lotions
- Lanolin
- Aloe Vera
- Olive Oil
- Methyl or Ethyl Parabens (para hydroxybenzoic acid)
- Dimethylsilicone

Planned Maintenance

The following maintenance schedule is suggested for the system and probes to ensure optimum operation and safety..

Table 14-3: Planned Maintenance Program

Do the Following	Daily	After Each Use	As Necessary
Inspect the Probes	X		X
Clean the Probes		X	X
Disinfect Probes		X	X

Returning/Shipping Probes and Repair Parts

US Department of Transportation and GE Medical Systems policy requires that equipment returned for service MUST be clean and free of blood and other infectious substances.

When you return a probe or part for service (Field Engineer or customer), you need to clean and disinfect the probe or part prior to packing and shipping the equipment.

Ensure that you follow probe cleaning and disinfection instructions provided in the Basic User Manual.

This ensures that employees in the transportation industry as well as the people who receive the package are protected from any risk.

Probe Discussion

Introduction

The LOGIQ 100 PRO supports the following types of probes:

- **Curved Array (Convex).** Curved Array (Convex) probes, including `micro' convex, are usually designated by the prefix/suffix "C"; the endocavitary probe is designated by the prefix/suffix "E".
- **Linear Array.** Linear Array probes are designated by the prefix/suffix "L".

Probe Naming Conventions

Table 14-4: Probe Naming Conventions

TYPE	DESCRIPTION
C	Convex
L	Linear

Linear Probes

Table 14-5: Linear Array Probes

Probe	Intended Uses	Capabilities and Features	Illustration
L76,LB	• Small Parts	• Wide field of view • Slant scan • Wideband for B-Mode resolution & homogenity • Biopsy capability	

Convex Probes

Table 14-6: Curved Array (Convex) Probes

Probe	Intended Uses	Capabilities and Features	Illustration
C36,C55,C 31,CZB	• General Purpose • Abdominal • OB/GYN	• Wide field of view • Small footprint • Biopsy capability	
E72	• Transvaginal • Transrectal	• Wide field of view • Small headshell and probe shaft • Biopsy capability	

Biopsy Special Concerns

Precautions Concerning the Use of Biopsy Procedures

Do not freeze the image during a biopsy procedure. The image must be live to avoid a positioning error.

Biopsy guidezones are intended to assist the user in determining optimal probe placement and approximate the needle path. However, actual needle movement is likely to deviate from the guideline. Always monitor the relative positions of the biopsy needle and the subject mass during the procedure.

The use of biopsy devices and accessories that have not been evaluated for use with this equipment may not be compatible and could result in injury.

The invasive nature of biopsy procedures requires proper preparation and technique to control infection and disease transmission. Equipment must be cleaned as appropriate for the procedure prior to use.

- Follow the probe cleaning and disinfection procedures and precautions to properly prepare the probe.
- Follow the manufacturer's instructions for the cleaning of biopsy devices and accessories.
- Use protective barriers such as gloves and probe sheaths.
- After use, follow proper procedures for decontamination, cleaning, and waste disposal.

Precautions Concerning the Use of Biopsy Procedures (continued)

CAUTION

Improper cleaning methods and the use of certain cleaning and disinfecting agents can cause damage to the plastic components that will degrade imaging performance or increase the risk of electric shock.

See ‘Probe Safety’ on *page 14-8 for more information.*

Preparing for a Biopsy

Displaying the Guidezone

To activate the biopsy guide:

Press the Control B while in B-Mode, the system displays the Biopsy Guides on the screen.

There are fixed and adjustable angle biopsy kits available with the LOGIQ 100 PRO depending on the probe. Select the desired angle of biopsy guides by using “CONTROL N”.

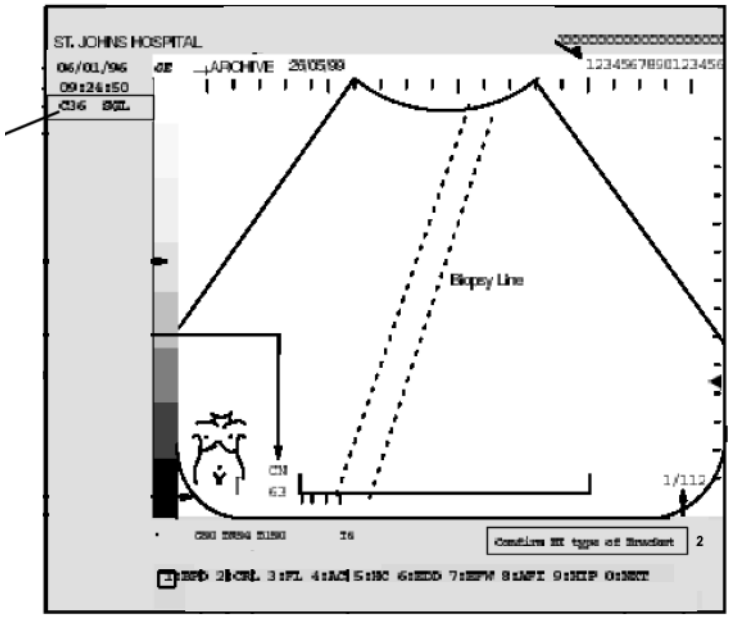


Figure 14-7. Biopsy Guidezones for C36 Probe

Displaying the Guidezone (continued)

The biopsy guidezone represents a path of the needle.

The display should be carefully monitored during a biopsy for any needle deviation from the center line or guidezone.

NOTE: To set up biopsy guidezones, refer to Table 14-7 for more details.

The needle may vary from the center line or guidezone for various reasons:

- Needle barrel to needle clearance or strength.
- Bracket manufacturing tolerance.
- Needle deflection due to tissue resistance.
- Needle size chosen. Thinner needles may deflect more.

Table 14-7: LOGIQ 100 PRO Biopsy Guide Availability

Probe	Fixed Angle	Multi-Angle		
		MBX1	MBX2	MBX3
C36	8.0	4.0	6.0	8.0
C55	7.0	4.0	5.5	7.0
L76	2.0	2.0	4.0	7.0
C31	6.0	n/a	n/a	n/a
CZB	3.0	2.0	3.0	4.5
LB	n/a	n/a	n/a	n/a

Displaying the Guidezone (continued)

Table 14-8: LOGIQ 100 PRO E72 Biopsy Guide Availability

Probe	Multi-Angle	
	TV	TR5
E72	10	13.3

DANGER

Failure to match the guidezone displayed to the guide may cause the needle to track a path outside the zone.

It is extremely important that when using the adjustable angle biopsy guides, the angle displayed on the screen matches the angle set on the guide, otherwise the needle will not follow the displayed guidezone which could result in repeated biopsies or patient injury.

NOTE: Although the multi-angle guides are compatible with the Civco Ultrapro and Ultrapro II, it is recommended the multi-angle guides only be used with the Ultrapro II.

Preparing the Biopsy Guide Attachment

Convex, Sector and Linear probes have optional biopsy guide attachments for each probe. The guide consists of a non-disposable bracket to attach to the probe, disposable needle clip to attach to the bracket, sheath, gel (sterile gel if necessary) and disposable needle barrels.

The disposable needle barrels are available for a variety of needle sizes.

Please refer to the manufacturer's instructions included in the biopsy kit.

Fixed Needle Biopsy Guide Assembly

1. Identify the appropriate biopsy guide bracket by matching the label on the bracket with the probe to be used.
2. Orient the bracket so that the needle clip attachment will be on the same side as the probe orientation mark (ridge).

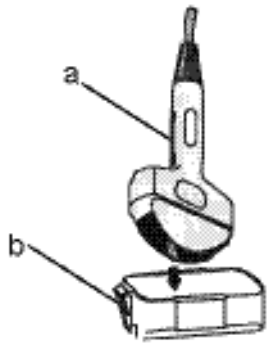


Figure 14-8. Probe/Bracket Alignment

a. Probe Orientation Mark
b. Bracket

3. Attach the biopsy bracket to the probe by sliding the bracket over the end of the probe until it clicks or locks in place.
4. Place an adequate amount of coupling gel on the face of the probe.
5. Place the proper sanitary sheath over the probe and biopsy bracket. Use the rubber bands supplied to hold the sheath in place.

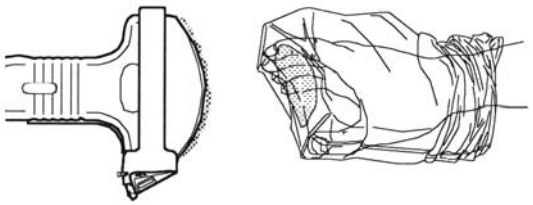


Figure 14-9. Applying Sanitary Sheath

Fixed Needle Biopsy Guide Assembly (continued)

6. Snap the fixed or adjustable needle clip onto the biopsy guide bracket.

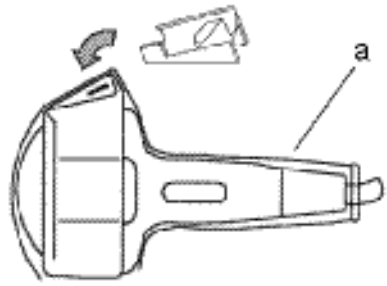


Figure 14-10. Fixed Needle Clip Attachment

a. Sheath

7. Push the locking mechanism towards the bracket to secure the lock. Make sure the needle guide is firmly attached to the bracket.

Figure 14-11. Locking the Needle Clip

8. Choose the desired gauge (size) needle barrel. Twist it back and forth to remove it from the plastic tree.

Figure 14-12. Needle Barrel Selection

Fixed Needle Biopsy Guide Assembly (continued)

9. Place the needle barrel into the needle clip with the desired gauge facing the needle clip and snap into place.

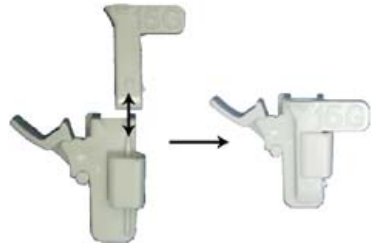


Figure 14-13. Needle Barrel Installation

CAUTION

Ensure that all guide parts are seated properly prior to performing a biopsy.

Multi Angle Biopsy Guide Assembly

WARNING

DO NOT attempt to use the biopsy bracket and needle guide until the manufacturer's instructions, provided with the biopsy bracket and needle guide in the kit, have been read and thoroughly understood.

1. Scan the patient and identify the target for biopsy. Move the probe to locate the target to the center of the image. Enable the system biopsy guidezone and try guidezone angles A1 to A3 to decide the best angle setting for needle path.
2. Identify the appropriate biopsy guide bracket by matching the label on the bracket with the probe to be used.

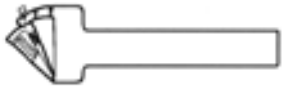


Figure 14-14. Multi-Angle Biopsy Guide Bracket

3. Orient the bracket so that the needle clip attachment will be on the same side as the probe orientation mark (ridge).

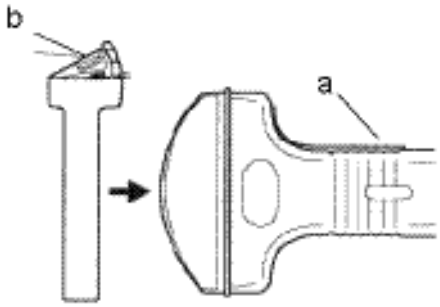


Figure 14-15. Probe/Bracket Alignment

   a. Probe Orientation Mark
   b. Bracket

4. Attach the biopsy bracket to the probe by sliding the bracket over the end of the probe until it clicks or locks in place.

Multi Angle Biopsy Guide Assembly (continued)

5. Pull up on the knob to freely move the needle guide attachment. Align the knob with the selected position of the needle guide attachment from MBX1, MBX2 and MBX3, to match the guidezone display on the ultrasound system.

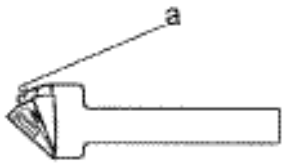


Figure 14-16. Select the angle position

a. Pull up

6. Push the knob down into the desired slot to secure the angle position of the needle guide attachment.

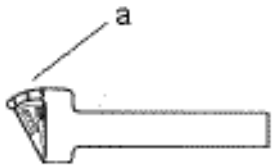


Figure 14-17. Fix the angle position

a. Push

CAUTION

Hold the bracket in place on the probe when pushing the knob to secure the angle position of the needle guide attachment. Excessive force may cause the bracket to release from the probe.

Multi Angle Biopsy Guide Assembly (continued)

7. Place an adequate amount of coupling gel on the face of the probe.
8. Place the proper sanitary sheath tightly over the probe and biopsy bracket. Use the rubber bands supplied to hold the sheath in place.

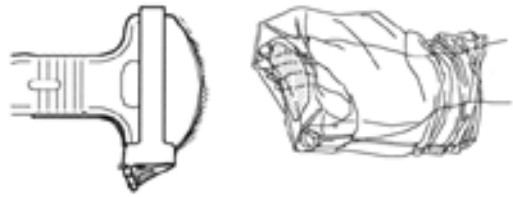


Figure 14-18. Applying Sanitary Sheath

9. Snap the needle clip onto the biopsy guide bracket.

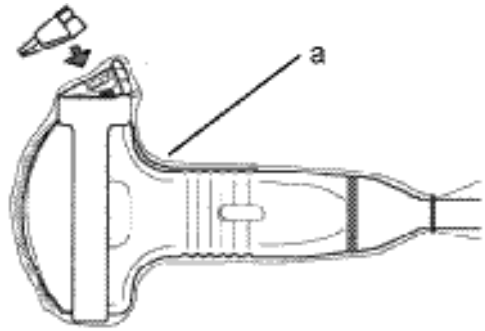


Figure 14-19. Fixing the Needle Clip Attachment

a. Sheath

10. Push the locking mechanism towards the bracket to secure the lock. Make sure the needle guide is firmly attached to the bracket.

Figure 14-20. Locking the Needle Clip

Multi Angle Biopsy Guide Assembly (continued)

11. Choose the desired gauge (size) needle barrel. Twist it back and forth to remove it from the plastic tree.

Figure 14-21. Needle Barrel Selection

12. Place the needle barrel into the needle clip with the desired gauge facing the needle clip and snap into place.

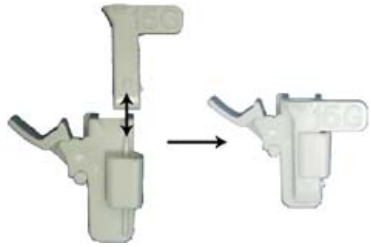


Figure 14-22. Needle Barrel Installation

CAUTION

Ensure that all guide parts are seated properly prior to perfoming a biopsy.

Releasing the needle

According to the following procedure, you remove the needle from a probe and an assembly without moving the needle.

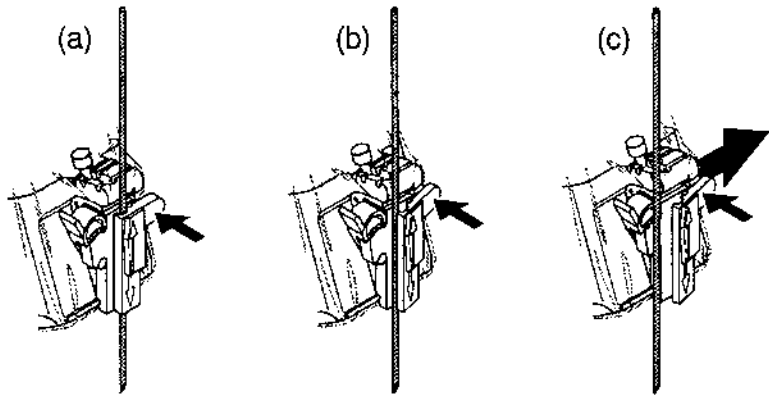


Figure 14-23. Release the needle from assembly

a. Push the knob portion of a sleeve in the direction of the arrow.
b. The needle is released from the assembly.
c. Push the probe and the assembly in the direction of the larger arrow to remove the needle.

Biopsy Needle Path Verification

To verify that the path of the needle is accurately indicated within the guidezone on the system monitor, perform the following:

- Properly install the bracket and biopsy guide.
- Scan in a container filled with water (47° C).
- Display the biopsy guidezone on the monitor.
- Ensure that the needle echo falls within the guidezone markers.

The Biopsy Procedure

WARNING

Biopsy procedures must only be performed on live images.

1. Place coupling gel on the scanning surface of the probe/ sheath/biopsy guide assembly.
2. Activate the biopsy guidezone on the system through the CONTROL B sequence. When using multi-angle guides, ensure that the proper guidezone angle is displayed.

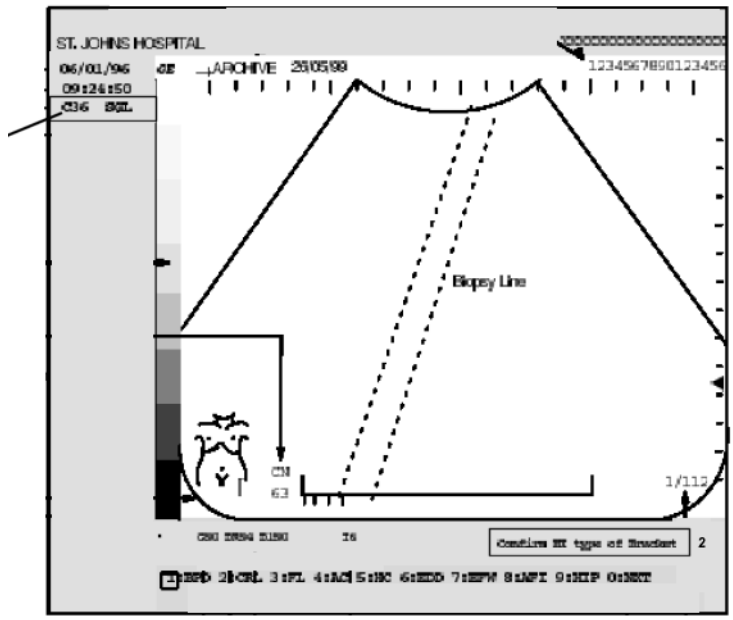


Figure 14-24. B-Mode

3. Scan to locate the target. Center the target in the electronic guidezone path.
4. Place the needle in the guide between the needle barrel and needle clip. Direct it into the area of interest for specimen retrieval.

Post Biopsy

When the biopsy is complete, remove the needle barrel, needle clip and probe sheath. Properly dispose of these items in accordance with current facility guidelines.

Clean and disinfect the probe. See ‘Probe Cleaning Process’ on *page 14-13 for more information.*

The biopsy bracket can be cleaned and disinfected in a recommended disinfecting agent and reused.

CAUTION

When the biopsy needle guide kit (UP1 or UP2) is opened, all parts must be discarded after the procedure whether they have been used or not.

E72 Probe Biopsy Guide Assembly

When the E72 probe is attached and active, the needle guide type is the TR5°(Civco disposable guide with a 5° offset angle)..

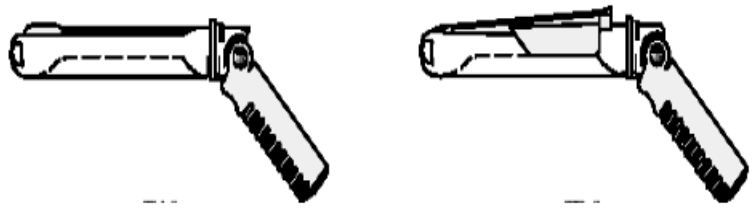


Figure 14-25. TR5° Biopsy Guide

To prepare the E72 for use:

1. Remove the probe from the box and carefully examine it for any damage.
2. If the biopsy guide is to be attached, use the filling removal tool to clean out the attachment area on the probe head.

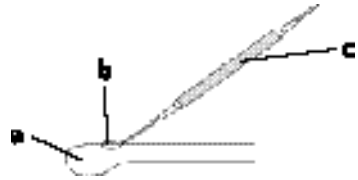


Figure 14-26. Attachment Filling Removal

   a. Probe Head
   b. Attachment
   c. Filling Removal Tool

3. Clean, then disinfect the probe.

NOTE: Ensure that protective gloves are worn.

E72 Probe Biopsy Guide Assembly (continued)

To install the sheath:

1. Remove the sheath from its package. Do not unroll the sheath.

NOTE: Remember to rinse all sanitary probe sheaths of powder before placing on the probe. Powder can degrade the displayed image.

2. Place an adequate amount of ultrasound gel inside the sheath tip (the gel is between the sheath inner surface and the probe aperture).

NOTE: Ensure that only acoustic coupling gel is used for this purpose.

3. Place the sheath tip over the probe aperture and then pull the sheath end toward the probe handle.
4. Inspect the sheath for nicks, cuts or tears.

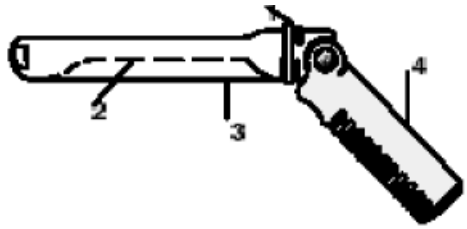


Figure 14-27. Probe with Sheath

a. Probe Handle
b. Sanitary Sheath
c. Probe Body

5. Rub a finger over the tip of the probe to ensure all air bubbles have been removed.
6. If a biopsy is to be performed, snap the metal or plastic biopsy guide on to the probe over the sheath.

E72 Probe Biopsy Guide Assembly (continued)

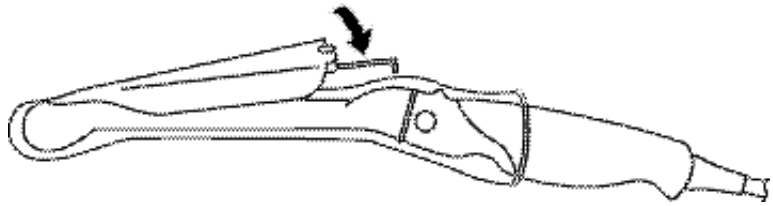


Figure 14-28. Civco Disposable Biopsy Guide 5° Angle

a. Fix wth a screw

7. Place an adequate amount of ultrasound gel on the gel-filled sheath tip's outer surface.
8. Ensure the guide is properly seated and secure by pushing forward on the needle insertion end of the guide until the attachment node is firmly in place in it's hole.

Surgery/Intra-operative Use

Preparing for Surgery/Intra-operative Procedures

Preparing the transducer for intra-operative use follows the same sterile procedure as for biopsy use except that no biopsy attachments are used. See ‘Preparing the Biopsy Guide Attachment’ on *page 14-26 for more information.* Sterile gel is applied to the transducer face and a sterile sheath completely covers the transducer and cable which has first undergone a thorough cleaning and high-level disinfection.

The invasive nature of biopsy procedures requires proper preparation and technique to control infection and disease transmission. Equipment must be cleaned as appropriate for the procedure prior to use.

CAUTION

For surgery/intra-operative procedures, a sterile environment is required. Therefore, both the operator and probe needs to be sterile.

Preparing for Surgery/Intra-operative Procedures (continued)

To ensure a sterile environment during the procedure, it is recommended that this be a two-person job.

1. Perform a high level disinfection of the probe.
2. The scanner (surgeon, sonographer, etc.) should be sterile and gloved.
3. Place an adequate amount of sterile coupling gel on the face of the probe.
4. Place the proper sterile sheath over the probe and cord.

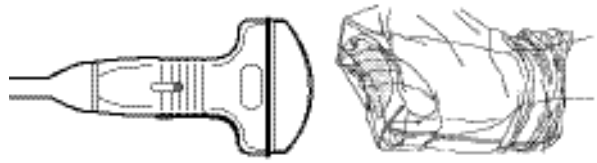


Figure 14-29. Applying Sterile Sheath

5. Depending on the type of procedure, use either sterile water or sterile gel on the sheath cover.

NOTE: Follow your institutions guidelines on post surgery/intra-operative procedures for probe cleaning and disinfection.

Chapter 15

User Maintenance

This chapter supplies system data, assistance information, and system care and maintenance instructions.

System Data

LOGIQ 100 PRO Features/Specifications

Table 15-1: Physical Attributes

Dimensions and Weight • Height: 244 +/- 15mm • Width: 302 +/- 15mm • Depth: 420 +/- 15mm • Weight: 9.8 Kg's (Without Probe) or Less Keyboard • Console with keyboard • Full alphanumeric keyboard • Ergonomic hard key operations Electrical Power • Voltage:100-120/220-240 Vac • Frequency: 50/60 Hz • Power: Max. 170 VA with built-in and on-board peripherals	Console Design • 1 Active Probe Port • Probe Holder, removable for cleaning and washing • Gel Holder, removable for cleaning and washing Monitor • 7 inch monochrome B/W display.

LOGIQ 100 PRO Features/Specifications (continued)

Table 15-2: System Overview

Applications • Abdominal • Obstetrical • Gynecological • Cardiac • Urological • Small parts • Pediatric • Neonatal Cephalic • Musculo-skeletal conventional • Transrectal • Transvaginal Scanning Methods • Micro Convex • Electronic Convex • Electronic Linear Operating Modes • B-Mode • M-Mode Display Modes • Simultaneous Capability (B/M); Dual B (B/B); • Quad Mode • Selectable alternating Modes (B or M); • Time line Display Transducer Types • Micro Convex Array • Convex Array • Linear Array	Standard Features • Standard CINE Memory (64 Frames) • Automatic Optimization (Auto Tissue Optimization) • Image Transfer to USB Flash Drive • Cardiac Calcs • OB Calcs • Fetal Trending • Gynecological Calcs • Urological Calcs • 112 image storage is standard. Options • Footswitch • Two Probe Port • L200 Probe Adapter Peripheral Options • B/W Printer • HP Laserjet Printer

LOGIQ 100 PRO Features/Specifications (continued)

Table 15-3: System Parameters

Post-Processing • Gray Scale Mapping (2 selections with 5 settings each) • Sweep Speed (B/M-Mode- 2 Seconds, M-Mode -4 Seconds) • Zoom Pre-Processing • Gain; TGC; Dynamic Range; Frame Averaging, ATO Image Processing and Presentation • Image Reverse: Right/ Left • Image Rotate : 180 degrees • Scroll (Depth/ Lateral) Zoom • PIP Zoom	Physiological Input Panel (Option) • Reference Scan: Simultaneous Display of Active Image and Trigger Update Image • Automatic Heart Rate Display CINE Memory/Image Memory • 64 Frames (standard)

LOGIQ 100 PRO Features/Specifications (continued)

Table 15-4: Measurements and Calculations

B-Mode Measurements • Distance • Circumference/ Area • Angle • Ratios M-Mode Measurements • Time Distance • Time intervel • Time Slope • Heart Rate	Obstetrics Measurements/Calculations • Gestational Age Calculation • EFW Calculation • Summary Report • Fetal Trend Graph Gynecology Measurements/Calculations • Summary Report • IVF Report Page Urology Measurements/Calculation • Summary Report Cardiac Measurements/Calculations • Summary Report

LOGIQ 100 PRO Features/Specifications (continued)

Table 15-5: Probes

• C36 Convex Probe (Applications: Abdomen, OB/ GYN, Urology, Small Parts, Biopsy) • C55 Convex Probe (Applications: Abdomen, OB/ GYN, Urology, Small Parts, Biopsy) • CZB Convex Probe (Applications: Abdomen, OB/ GYN, Urology, Small Parts, Biopsy) • E72 Micro Convex Endocavity -Probe (Applications: Transvaginal, Transrectal, OB/ GYN, Urology)	• C31 Micro Convex Endocavity -Probe (Applications: Transvaginal, Transrectal, OB/ GYN, Urology) • L76: Linear Probe (Application: Small Parts, Biopsy) • LB: Linear Probe (Application: Small Parts, Biopsy)

WARNING

Strictly use the probes for only those applications as mentioned in Table 15-5, Otherwise it may lead mis-diagnostics.

Table 15-6: Inputs and Outputs Signal

• Video In (Enables an external signal (VCR play back). • Video Out (Enables the connection of a video signal to external equipment Video graphic printer, VCR recording.)	• Connectors [Remote for black/white Printer (2); Remote for Footswitch; remote for USB drive]

WARNING

“EQUIPMENT not suitable for use in the presence of a FLAMABLE ANAESTHETIC MIXTURE WITH AIR or WITH OXYGEN or NITROUS OXIDE”

Clinical Measurement Accuracy

Basic Measurements

The following information is intended to provide guidance to the user in determining the amount of variation or measurement error that should be considered when performing clinical measurements with this equipment. Error can be contributed by equipment limitations and improper user technique. Be sure to follow all measurement instructions and develop uniform measurement techniques among all users to minimize the potential operator error. Also, in order to detect possible equipment malfunctions that could affect measurement accuracy, a quality assurance (QA) plan should be established for the equipment that includes routine accuracy checks with tissue mimicking phantoms.

Please be advised that all distance and Doppler related measurements through tissue are dependent upon the propagation velocity of sound within the tissue. The propagation velocity usually varies with the type of tissue, but an average velocity for soft tissue is assumed. This equipment is designed for, and the accuracy statements listed on are based on, an assumed average velocity of 1540 m/s. The percent accuracy when stated applies to the measurement obtained (not the full scale range). Where the accuracy is stated as a percent with a fixed value, the expected inaccuracy is the greater of the two.

Basic Measurements (continued)

Table 15-7: System Measurements and Accuracies

Measurement	Units	Useful Range	Accuracy	Limitations or Conditions
Depth	mm	Full Screen	±5% or 1 mm	
Distance:				
Axial	mm	Full Screen	±5% or 1 mm	
Lateral	mm	Full Screen	±5% or 2 mm	Linear Probes
Lateral	mm	Full Screen	±5% or 4 mm	Convex Probes
Lateral	mm	Full Screen	±5% or 4 mm	Sector Probes
Circumference:			±5% or 1 mm	
Trace	mm	Full Screen	±10% or 1 mm	
Ellipse	mm	Full Screen	±5% or 1 mm	
Area:			±5% or 1 mm	
Trace	mm^2	Full Screen	±5% or 1 mm^2	
Ellipse	mm^2	Full Screen	±5% or 1 mm^2	
Time	s	Timeline Display	±5% or 10 ms	M-Mode Only
Slope	mm/s	Timeline Display	±5% or 1 mm/s	M-Mode Only

Clinical Calculation Accuracy

Estimate the overall inaccuracy of a combined measurement and calculation by including the stated inaccuracy from the basic measurement accuracy statements.

CAUTION

Diagnostic errors may result from the inappropriate use of clinical calculations. Review the referenced source of the stated formula or method to become familiar with the intended uses and possible limitations of the calculation.

Calculation formulas and databases are provided as a tool to assist the user, but should not be considered an undisputed database, in making a clinical diagnosis. The user is encouraged to research the literature and judge the equipment capabilities on an ongoing basis in order to assess its utility as a clinical tool.

System Care and Maintenance

Overview

Refer to chapter 10 of the LOGIQ 100 PRO Service Manual for any additional maintenance guidance.

Contact the local Service Representative for parts or periodic maintenance inspections.

Inspecting the System

Examine the following on a monthly basis:

- Connectors on cables for any mechanical defects.
- Entire length of electrical and power cables for cuts or abrasions.
- Equipment for loose or missing hardware.
- Control panel and keyboard for defects.
- Casters for proper locking operation.

To avoid electrical shock hazard, do not remove panels or covers from console. This servicing must be performed by qualified service personnel. Failure to do so could cause serious injury.

If any defects are observed or malfunctions occur, do not operate the equipment but inform a qualified service person. Contact a Service Representative for information.

Daily Maintenance

The system requires daily care and maintenance to function safely and properly. do the following:

- After each use, remove the coupling gel from the probe by wiping with a soft cloth or rinsing with flowing water.
- Check the probe and probe cable for cracks or deterioration.

Failure to perform required maintenance may result in unnecessary service calls.

Weekly Maintenance

The system requires weekly care and maintenance to function safely and properly. Clean the following:

- Check probes for damages
- Check system power cord for any cracks or damages
- The unit and the system cabinet
- Monitor
- Operator control panel
- Footswitch
- Video Graphic Printer
- Video Cassette Recorder (VCR)

Failure to perform required maintenance may result in unnecessary service calls.

Monthly Maintenance

Examine the following on a monthly basis:

- Visually inspect the unit every month.
- Check for mechanical problems, or keyboard problems.
- Check the electrical and power cables for cracks, cuts, nicks or abrasions
- Check the equipment for loose or missing hardware.
- Clean the Video page printer and display monitor.

Failure to perform required maintenance may result in unnecessary service calls.

Cleaning the system

Prior to cleaning any part of the system:

1. Turn off the system power. If possible, disconnect the power cord. See ‘Power Off’ on page 3-21 for more information.

System Cabinet

To clean the system cabinet:

1. Moisten a soft, non-abrasive folded cloth with a mild, general purpose, non-abrasive soap and water solution.
2. Moisten a soft, non-abrasive folded cloth.
3. Wipe down the top, front, back, and both sides of the system cabinet.

NOTE: Do not spray any liquid directly into the unit.

Monitor

To clean the monitor face:

Use a soft, folded cloth. Gently wipe the monitor face.

Do NOT use a glass cleaner that has a hydrocarbon base (such as Benzene, Methyl Alcohol or Methyl Ethyl Ketone) on monitors with the filter (anti-glare shield). Hard rubbing will also damage the filter.

NOTE: When cleaning the screen, make sure not to scratch the LCD.

Operator Controls

To clean the operator control panel:

1. Moisten a soft, non-abrasive folded cloth with a mild, general purpose, non-abrasive soap and water solution.
2. Wipe down operator control panel.
3. Use a cotton swab to clean around keys or controls. Use a toothpick to remove solids from between keys and controls.

NOTE: When cleaning the operator control panel, make sure not to spill or spray any liquid on the controls, into the system cabinet, or in the probe connection receptacle.

NOTE: In case of SARS, use bleach, alcohol, or Cidex in a normal diluted form for cleaning/disinfecting the operator panel.

NOTE: DO NOT use T-spray or Sani Wipes on the control panel.

Footswitch

To clean the footswitch:

1. Moisten a soft, non-abrasive folded cloth with a mild, general purpose, non-abrasive soap and water solution.
2. Wipe the external surfaces of the unit then dry with a soft, clean, cloth.

Trackball

1. Power off the system.
2. Rotate the retainer ring counterclockwise until it can be removed from the keyboard.

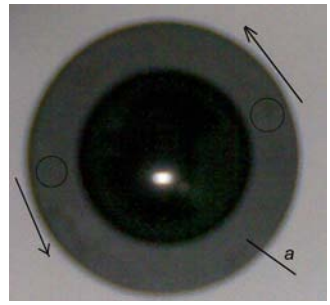


Figure 15-1. Rotating the Retainer Ring

a. Retainer Ring

Trackball (continued)

3. Lift off the Trackball from the keyboard.

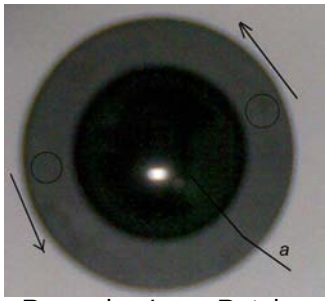


Figure 15-2. Removing Inner Retainer and Trackball

a. Trackball

4. Wipe off any oil or dust from the Trackball using a cleaner or dry cloth.
5. Wipe off any oil or dust from the two rollers using a cleaner or cotton swab.

CAUTION

When cleaning the roller, make sure not to spill or spray any liquid into the Trackball housing (keyboard or system). Use either ethanol, isopropyl alcohol or VCR head cleaner to clean the Trackball assembly. Avoid other solvents that may damage the mechanical parts of the Trackball assembly.

Trackball (continued)

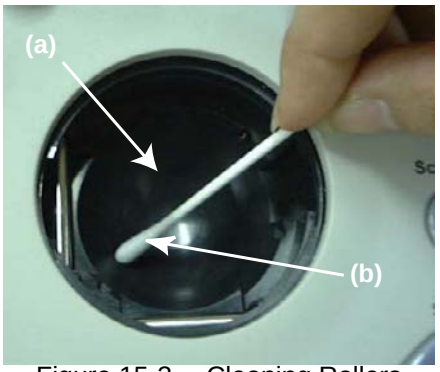


Figure 15-3. Cleaning Rollers

a. Cotton Swab
b. Rollers

Trackball (continued)

6. Insert the Trackball into the housing.
7. Place the Trackball into the housing with its stopper facing down. Lift off the Trackball from the keyboard.

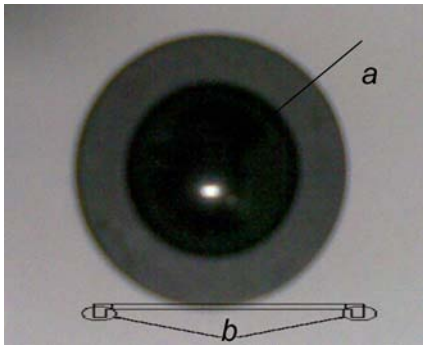


Figure 15-4. Set Inner Retainer and Trackball

a. Trackball
b. Stopper

Trackball (continued)

8. Install the Trackball retainer ring onto the inner retainer, then rotate it clockwise until its notches are set in the horizontal position.

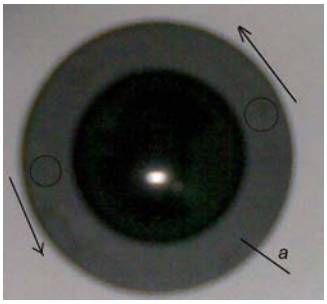


Figure 15-5. Rotating the Retainer Ring

a. Retainer Ring

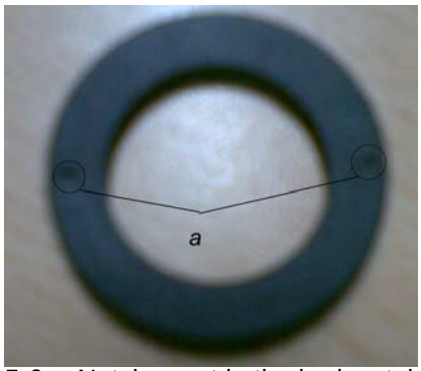


Figure 15-6. Notches set in the horizontal position

a. Notches (Set Horizontally)

Video Graphic Printer

To clean the external surface of the video page printer:

1. Turn off the power. If possible, disconnect the power cord.
2. Wipe the external surfaces of the unit with a soft, clean, dry cloth.
3. Remove stubborn stains with a cloth lightly dampened with a mild detergent solution.

NOTE: Never use strong solvents, such as thinner or benzine, or abrasive cleansers because they will damage the cabinet.

No further maintenance, such as lubrication, is required.

To clean the surface of the print head:

1. Run the cleaning sheet (provided with the printer) through the printer.

For more information, see the Video Page Printer's Operator Manual.

Assistance

Supplies/Accessories

CAUTION

DO NOT connect any probes or accessories without approval by GE.

The following supplies/accessories have been verified to be compatible with the system:

Peripherals

Table 15-8: Peripherals and Accessories

Accessory	Units
Sony B/W Printer Model UP-897MDW/UPD-897 (Option) HP Laser Jet 1020(Option) Transend USB Memory Stick (Option)	Each Each Each

Console

Table 15-9: Console Accessories

Accessory	Units
Footswitch (Otpion)	Each

Probes

Table 15-10: Probes and Accessories

Accessory	Units
C36	Each
C55	Each
C31	Each
L76	Each
E72	Each
CZB	Each
LB	Each

Gel

Table 15-11: Gel

Accessory	Units
Aquasonic 100 Scan Gel	5 liter jug
	250 ml plastic bottles (12/case)
Scan Ultrasound Gel	8 oz plastic bottles (12/case)
	1 gallon plastic jug
	Four 1-gallon plastic jugs

Disinfectant

Table 15-12: Disinfectant

Accessory	Units
Cidex Activated Dialdehyde	16/1 quart bottles
	4/1 gallon bottles
	2/2.5 gallon bottles

Ultrasound Probe and Cord Sheath Sets

Table 15-13: Probe and Cord Sheath Sets

Accessory	Units
Sterile Ultrasound Probe Sheath Set	20 Per Set
Sterile Ultrasound Cord Sheath Set	20 Per Set
Sanitary Rectal/Vaginal Probe Cover	20 Per Set
Sterile Combination Probe and Cord Cover Set	12 Per Set
Sterile Ultrasound Probe Sheath Set for Wide (2.5 and 3.5) Aperture Sector Probes	20 Per Set

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